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The Resources Agency

DEPARTMENT OF WATER RESOURCES
Division of Operations and Maintenance

STATE WATER PROJECT ANNUAL REPORT OF OPERATIONS 1995

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Table Of Contents

Section

Organization Page

Foreword

Table of Contents

Abbreviations and Units

Introduction

Highlights of 1995 Operation

Project Status in 1995

Project Facilities

Outages and Limitations

Water Supply Conditions

Water Operations

Reservoir Operations

Water Deliveries and Aqueduct Operations

Significant Operational Activities

Energy Operations

Energy Sources

Energy Loads

Sacramento-San Joaquin Delta Operations

Delta Outflow Index

Project Operations by Field Division

Oroville Field Division

Water Storage

Water Deliveries

Delta Field Division

Water Storage

Water Deliveries

Pumping Plants

San Luis Field Division

Water Storage

Pumping and Generating Plants

Water Deliveries

San Joaquin Field Division

Water Deliveries

Pumping Plants

Southern Field Division

Water Storage

Water Deliveries

Pumping and Generating Plants

Tables

No.

- 1 Project Pumping by Plant, 1995
- 2 Water Deliveries, 1962-1995
- 3 SWP Energy Resources, 1995
- 4 Total Energy Loads, 1995
- 5 Delta Outflow Index, 1995
- 6 Sacramento Basin and Sacramento-San Joaquin Delta Operations, 1995
- 7 Upper Feather Area Lakes Monthly Operation, 1995
- 8 Lake Oroville Monthly Operation, 1995
- 9 Thermalito Forebay Monthly Operation, 1995
- 10 Thermalito Afterbay Monthly Operation, 1995
- 11 Lake Del Valle Monthly Operation, 1995
- 12 Clifton Court Forebay Monthly Operation, 1995
- 13 San Luis Reservoir Monthly Operation, 1995
- 14 O'Neill Forebay Monthly Operation, 1995
- 15 Monthly Operations Summary, State-Federal San Luis Joint-Use Facilities, 1995
- 16 Pyramid Lake Monthly Operation, 1995
- 17 Elderberry Forebay Monthly Operation, 1995
- 18 Castaic Lake Monthly Operation, 1995
- 19 Castaic Lagoon Monthly Operation, 1995
- 20 Silverwood Lake Monthly Operation, 1995
- 21 Lake Perris Monthly Operation, 1995
- 22 Summary of Governor Edmund G. Brown California Aqueduct Operations

Figures

No.

- 1 Total Deliveries from SWP Facilities, Annual Totals
- 2 Combined Operation of Hyatt-Thermalito Powerplants
- 3 SWP Energy Resources, 1995
- 4 Total Energy Resources, 1995
- 5 SWP Energy Loads, 1995
- 6 Total Energy Loads, 1995
- 7 Delta Tide, Inflow, and Outflow Index, 1995
- 8 Coordinated Delta Operations, 1995
- 9 Coordinated Delta Operations, Lagged Storage Withdrawals, 1995
- 10 Coordinated Delta Operations, Delta Exports, 1995
- 11 Oroville-Thermalito Complex, Inflow, Releases, and Diversions, 1995
- 12 Historical Lake Oroville Operation
- 13 Operation of Lake Oroville for Flood Control, 1995
- 14 Lake Oroville Temperatures, 1995

- 15 Historical Lake Del Valle Operation
- 16 Historical San Luis Reservoir Operation
- 17 Historical Pyramid Lake Operation
- 18 Historical Castaic Lake Operation
- 19 Historical Silverwood Lake Operation
- 20 Historical Lake Perris Operation

Maps

No.

- 1 Project Facilities
- 2 Field Division Boundaries
- 3 Water Deliveries

Abbreviations and Units

The following abbreviations are commonly used throughout this report.

AF	acre-feet
Banks	Harvey O. Banks Delta Pumping Plant
California Aqueduct	Governor Edmund G. Brown California Aqueduct
CEA	Capacity Exchange Agreement
CVP	Central Valley Project
cfs	cubic feet per second
D-1485	Water Rights Decision 1485
DFG	Department of Fish and Game
DOI	Delta Outflow Index
DPR	Department of Parks and Recreation
DWR	Department of Water Resources
DO	dissolved oxygen
EC	electrical conductivity
FRSA	Feather River Service Area
ft	feet
KCWA	Kern County Water Agency
kv	kilovolt
kW	kilowatt
kWh	kilowatt-hour
LADWP	Los Angeles Department of Water and Power
MAF	million acre-feet
MW	megawatt
MWh	megawatthour
MWDSC	Metropolitan Water District of Southern California
NDOI	Net Delta Outflow Index
PG&E	Pacific Gas and Electric Company
SCE	Southern California Edison
SDWA	South Delta Water Agency
SRI	Sacramento River Index
SWP	State Water Project
SWRCB	State Water Resources Control Board
USBR	United States Bureau of Reclamation

Introduction

The 1995 Annual Report of Operations for the State Water Project is divided into seven parts. The first two parts, "Highlights of 1995 Operation" and "Project Status in 1995," cover conditions and events of statewide significance. The following three sections cover water conditions, water operations, and energy operations in 1995. The sixth part, "Sacramento-San Joaquin Delta Operations," gives special emphasis to Delta operations, a key aspect of the SWP. The last part, "Project Operations by Field Division," provides details on activities by field division as outlined on Map 2.

Highlights of 1995 Operation

Managing available water supplies during the recent drought required activities designed to make the most beneficial use of water available to the SWP. The Department of Water Resources initially structured its plan of operations according to the concept of a firm yield. Firm yield is the quantity of water that can be made available on a firm annual basis to water contractors during a drought period. In 1991, after years of discussion, DWR changed its approval procedures to the concept of variable yield. Operating on the basis of a variable yield makes efficient use of available water supplies during a drought. DWR also developed programs to compensate for the lack of storage. These programs include water transfers, exchanges, loans, storage, purchases, and carry-over entitlement for delivery at a later date.

Initial requests for entitlement water totaled about 3.98 MAF. The initial allocation in December 1994 provided for only 40 percent of Table A entitlements or 1.63 MAF. On January 13, 1995, due to increased supplies, DWR approved 60 percent of 1995 Table A entitlements or 2.4 MAF. On January 24, due to high precipitation and reduced demand, DWR approved 100 percent of requests of 3.2 MAF. In April 1995, after the contractors turned back 820 TAF, DWR made the final allocation of 2.37 MAF.

Water year 1994-95 was one of California's wettest years this century. October and November were quite dry but a mid-December storm provided above average precipitation. Intense warm winter storms in January caused widespread flooding statewide. SWP Flood Operations Center staff were on alert status for 11 days. After a dry February, March was another wet month—the wettest March in 70 years. The Arroyo Pasajero was particularly hard hit. Floodwaters caused land erosion which undermined the I-5 bridge foundation resulting in its collapse. The bridge collapse caused the death of seven people traveling along I-5. The California Aqueduct also sustained

substantial damage costing millions of dollars in repairs and silt removal. Further details of the flooding are discussed under "*Water Supply Conditions*" and "*Significant Operational Activities*."

DWR and USBR did not declare balanced Delta water conditions during 1995. This was the first year that balanced conditions were not declared after eleven consecutive years in which balanced water conditions were declared.

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, and aqueducts to deliver water. Although initial transportation facilities were essentially completed in 1973, other facilities have been constructed since then and still others are under construction or are scheduled to be built as needed. The SWP facilities now comprise 27 dams and reservoirs, 25 pumping and generating plants, and nearly 600 miles of aqueducts.

Energy resources totaled 9,569,191 MWh which included generation of 6,436,357 MWh from SWP energy resources, purchases of 692,793 MWh, other resources of 119,850 MWh, 557 MWh of actual deviation, and 2,732,134 MWh of SCE return additional (see Figure 4). Energy loads of 9,569,191 MWh include sales of 5,322,944 MWh, 4,003,983 MWh used to deliver water to SWP contractors, 235,979 MWh of losses, and 6,285 MWh of deviation (see Figure 6).

SWP facilities delivered 4,069,745 AF of water to 40 agencies, including 25 long-term water contractors, in 1995 as shown on Table 2. This amount is approximately 354 TAF more than the total State and federal water deliveries from the SWP in 1994. State contractor deliveries were 2,002,557 AF; including 1,904,764 AF of entitlement water and 97,793 AF of other water; excluding Joint Facilities and prior water right deliveries. See the "*Water Deliveries and Aqueduct Operations*" section for more details on water deliveries.

Project Status in 1995

Project Facilities

The SWP conserves water for distribution to much of California's population and to irrigated agriculture. It also provides flood control, water quality control, electrical power generation, new recreational opportunities, and enhancement of sport fisheries and wildlife habitat.

SWP facilities in operation during 1995 included: 27 water storage facilities, 3 pumping-generating plants, 5 power plants, 14 pumping plants, and nearly 600 miles of aqueduct.

The SWP begins with three small lakes on the Feather River tributaries: Lake Davis, Frenchman Lake, and Antelope Lake. The branches and forks of the Feather River flow into Lake Oroville, the SWP's principal reservoir with a capacity of about 3.5 MAF. From Oroville, water flows through a complex system of powerplants, then down the Feather River into the Sacramento River before reaching the Delta. From the northern Delta, water is supplied to Napa and Solano counties through the North Bay Aqueduct.

Near Byron, in the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. The Banks Pumping Plant lifts water into Bethany Reservoir. The South Bay Pumping Plant then lifts it into the South Bay Aqueduct. Through the South Bay Aqueduct water is supplied to Alameda and Santa Clara Counties. Most of the water from the Bethany Reservoir, however, flows into the Governor Edmund G. Brown California Aqueduct. At O'Neill Forebay, part of the water is pumped through the Gianelli Pumping-Generating Plant for storage in San Luis Reservoir until needed. DWR's share of storage in the reservoir is 1,062,000 AF.

Water not stored in San Luis Reservoir continues its flow south and is raised 1,069 ft by four pumping plants: Dos Amigos, Buena Vista, Teerink, and Chrisman. In the southern San Joaquin Valley, the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. At the Tehachapi Mountains, Edmonston Pumping Plant raises the water 1,926 ft and the water enters 8.5 miles of tunnels and siphons. Once the water has crossed the Tehachapi Mountains, it flows through the California Aqueduct into the Antelope Valley.

The California Aqueduct then divides into two branches, the East Branch and West Branch. The East Branch carries water through the Antelope Valley into Silverwood Lake. From Silverwood Lake, the water enters the San Bernardino Tunnel and drops

1,418 ft into Devil Canyon Powerplant, then to Lake Perris, SWP's southernmost reservoir.

Water in the West Branch flows through Warne Powerplant into Pyramid Lake. From Pyramid Lake the water flows through the Angeles Tunnel and Castaic Powerplant into Castaic Lake, terminus of the West Branch. For the location of facilities cited here, see Map 1.

Lake Oroville and San Luis Reservoir are the primary conservation facilities of the SWP's 27 dams and reservoirs. The remaining 25 dams and reservoirs are used principally to regulate the conserved supply into water delivery patterns designed to fit local needs. Of those 25 the five largest are Lake Del Valle, Pyramid Lake, Castaic Lake, Silverwood Lake, and Lake Perris. The southern reservoirs are near the metropolitan areas of southern California, where water supplies are mainly imported. Information about these reservoirs, including amounts of unimpaired runoff to Lake Oroville and storage levels for SWP's conservation, and other storage facilities are summarized in this report.

Outages and Limitations

Major outages, construction, and operating limitations of SWP facilities during 1995 were:

January

- Banks Pumping Plant Unit 2 out of service from January 3 to January 31 to measure field coils for future replacement.
- Las Perillas Pumping Plant Unit 5 out of service from January 5 to February 17 for annual mechanical preventive maintenance.
- Hyatt Powerplant Unit 2 out of service from January 19 to February 22 for annual maintenance and trouble calls.
- Thermalito Pumping-Generating Plant Unit 1 out of service from January 27 to March 1 for annual maintenance.

February

- Badger Hill Pumping Plant Unit 5 out of service from February 21 to March 30 for annual mechanical preventive maintenance.
- Devil Canyon Powerplant out of service from February 21 to March 7 to repair leak in a 3" bypass valve.

- Oso Pumping Plant Unit 1 out of service from February 23 to May 15 to disconnect the existing control system and make connections to the new system.
- Gianelli Pumping-Generating Plant Units 7 and 8 and #4 penstock out of service from February 28 to March 31 to inspect penstock, perform bi-annual maintenance on Unit 7, and do a complete overhaul on Unit 8.
- Gianelli Pumping-Generating Plant Units 8 continued out of service under an additional clearance until October 12 to complete overhaul.

March

- Alamo Powerplant Unit 1 and penstock out of service from March 19 to April 10 to check bearing clearance and install piping for turbine air suppression system.
- Edmonston Pumping Plant Unit 6 out of service from March 20 to March 31 to replace cooling water piping in unit motor room.
- Hyatt Powerplant Unit 3 out of service from March 27 to May 31 for annual maintenance and rewedge stator.
- Pearblossom Pumping Plant #3 discharge line and Units 7, 8, & 9 out of service from March 26 to April 4 for contractor to replace upstream seat seals on Units 7, 8, & 9.
- Thermalito Pumping Generating Plant Unit 2 out of service from March 29 to April 19 for annual maintenance and job orders.
- Edmonston Pumping Plant Unit 3 out of service from March 27 to April 7 to replace cooling water piping in unit motor room.

April

- Skinner Fish Facility New holding tank building out of service from April 3 to May 15 to reinstall rebuilt collect valve for holding tank #7.
- California Aqueduct Check 32, gate 1 out of service from April 12 to June 12 to remove gate, repair and install anodes.
- California Aqueduct Check 31, gate 3 out of service from April 12 to June 6 to remove gate, repair and install anodes.
- Badger Hill Pumping Plant Unit 4 out of service from April 10 to May 5 for annual mechanical preventive maintenance.
- Buena Vista Pumping Plant Unit 10 out of service from April 13 to October 31 to install stainless impeller and inspect discharge line #8.

- Devil Canyon Powerplant Unit 4 out of service from April 12 to April 24 to grind turbine buckets for future efficiency tests.
- Reid Gardner Powerplant Unit 4 out of service from April 16 to May 26 for scheduled maintenance.
- Hyatt Powerplant Unit 4 out of service from April 17 to April 28 to investigate transformer combustible gas build up and repair same.
- South Bay Pumping Plant 1st stage out of service from April 22 to May 6 to replace cooling water line.
- Chrisman Pumping Plant Unit 2 out of service from April 24 to December 29 for impeller replacement, pump case refurbishment and stator rewind.

May

- Edmonston Pumping Plant Unit 2 out of service from May 1 to May 15 to replace corroded cooling water piping.
- Banks Pumping Plant Unit 2 out of service from May 1 to June 16 to remove rotor for contractor to inspect stator coils.
- Alamo Powerplant Unit 1 out of service from May 8 to May 31 for annual calibration of relays.
- Las Perillas Pumping Plant Unit 4 out of service from May 15 to June 9 for annual mechanical preventive maintenance.
- Edmonston Pumping Plant Units 6 and 8 out of service from May 15 to May 26 to replace corroded cooling water piping.
- Pearblossom Pumping Plant Unit 3 out of service from May 22 to June 23 for annual preventive maintenance.
- Oso Pumping Plant Unit 2 out of service from May 25 to July 1 to replace impeller and annual preventive maintenance.

June

- Devil Canyon Powerplant Unit 1 out of service from June 29 to July 14 for annual preventive maintenance.

July

- Warne Powerplant Unit 1 out of service from July 31 to August 8 for semi-annual electrical preventive maintenance.

August

- Pearblossom Pumping Plant Discharge line 2 out of service from August 23 to August 31 to re-

move and rebuild discharge valve ram and replace O-Rings.

September

- South Bay Pumping Plant Stage 1 out of service from September 11 to November 22 for replacement of stage 1 switch gear.
- Southern California Aqueduct Pool 49 out of service from September 23 to November 16 to repair liner.
- Chrisman Pumping Plant 2 discharge line and Units 4 & 5 out of service from September 25 to October 16 to repair leak in coupling and replace O-ring.
- Teerink Pumping Plant Unit 2 out of service from September 25 to November 17 for annual motor maintenance.

October

- Southern California Aqueduct Pool 63 out of service from October 1 to November 23 for Mojave Water Agency to install new turnout.
- Hyatt Powerplant Unit 4 was out of service from October 2 to November 8 for annual maintenance and equipment modification.
- Devil Canyon Powerplant and Santa Ana Pipeline out of service from October 15 to November 12 for contractor to inspect and repair bad sections of pipe.
- Alamo Powerplant Penstock and unit I out of service from October 11 to November 20 to remove and repair discharge valve.
- Mojave Siphon Pipeline out of service from October 20 to November 4 for biannual inspection.
- Las Perillas Pumping Plant Unit 1 out of service from October 25 to November 22 for annual mechanical preventive maintenance.
- Pearblossom Pumping Plant Discharge line 3 and units 7, 8, & 9 out of service from October 31 to December 1 for contractor to repair discharge valve seats and replace leaking mechanical seals.

November

- Pine Flat Powerplant Unit 1 out of service from November 6 to November 30 for annual maintenance.
- Clifton Court Forebay Out of service from November 7 to November 17 for safety of dams embankment inspection.
- California Aqueduct Pool 7 out of service from November 7 to January 7, 1996 to drain pool and repair liner.
- Hyatt Powerplant Unit 1 out of service from November 13 to January 3, 1996 for annual maintenance, stator rewedge and turbine inspection.
- Thermalito Powerplant Unit 2 out of service from November 16 to December 20 for annual maintenance and modifications.
- Warne Powerplant Unit 1 out of service from November 17 to December 29 to adjust restoring arm cable, calibrate actuator and modify deflector circuit.
- Las Perillas Pumping Plant Unit 2 out of service from November 20 to December 11 for annual mechanical preventive maintenance.

December

- Edmonston Pumping Plant Unit 13 out of service from December 4 to April 4, 1996 for warranty rewedge of unit 13 stator.
- Warne Powerplant and Peace Valley Pipeline out of service from December 17 to December 25 for inspection and sounding of prestressed concrete pipe.
- South Bay Aqueduct out of service from December 3 to December 17 to inspect and repair canal panels.
- Pine Flat Powerplant Unit 3 generator out of service from December 6 to December 29 for annual maintenance.
- Thermalito Powerplant Unit 4 out of service from December 21 to January 30, 1996 for annual maintenance, modifications and repairs.

Water Supply Conditions

The SWP monitors precipitation and calculates runoff to coordinate the operation of the complex system of dams and reservoirs. Information on those activities is based on water supply conditions.

Total runoff in the Sacramento River Basin in northern California has been as little as 5.1 MAF in 1977, and as much as 38 MAF in 1983 (the 50-year average is about 18 MAF). This runoff constitutes the primary SWP water supply.

Water year 1994-95 was one of California's wettest years this century. The previous water year had been critically dry, prompting fears that the drought had returned. Conditions during the first 3 months of the new season were not unusual; seasonal precipitation totals at the end of December 1994 were about 90 percent of average. This all changed during the first week of January 1995, when a storm of subtropical origin unleashed the first set of floods that year. January statewide precipitation was triple average, restoring reservoir storage to near average levels. February was very dry with about 35 percent of average precipitation. March saw a renewal of rains, again triple average for the month, with some record floods in the Central Coast region, which included Arroyo Pasa-jero. April, May, and June precipitation were above average. June rainfall was again three times average for the month, but since June is normally a dry month this did not affect volumes much. June was also cool through the middle of the month, and the delay in high elevation snow-melt added to the uncertainty of runoff. July, August, and September were dry with fewer summer mountain showers than usual.

The first 2 months of the 1995-96 water year, October and November were extremely dry. A strong storm in mid-December, however, provided above average precipitation for that month and greatly improved the outlook for the 1995-96 water year.

Runoff was boosted during 2 very wet months, January and March. January runoff statewide was about 2.5 times average and runoff during March was 3 times average. Runoff for water year 1994-95 was 184 percent of average compared to only 40 percent the previous year. If February had not been dry, runoff in water year 1994-95 probably would have been about the same as the 220 percent in 1983, the wettest year this century. Sacramento River basin unimpaired runoff was 33.9 MAF, the second wettest year of record, just above the 33.7 MAF reported in 1907. San Joaquin River system unimpaired runoff (including the Stanislaus, Tuolumne, Merced, and upper San Joaquin River at Friant) was 12.4 MAF, making 1995 the third wettest year of record. Snowmelt runoff during April through July was the fourth wettest for both the Sacramento and San Joaquin River systems. The April 1 snowpack was 175 percent of average, compared to 50 percent in 1994, 150 percent in 1993, and 220 percent statewide in 1983. The larger snowpack and subsequent melt helped fill most of the State's major reservoirs.

By the end of the water year on September 30, storage at major in-state reservoirs was 28 MAF, about 130 percent of average and nearly 13 MAF more than the 16 MAF (73 percent of average) in storage on September 30, 1994.

Water Operations

Reservoir Operations

Lake Oroville and San Luis Reservoir are the two main conservation facilities for SWP water supplies. Table 8 and Table 13 summarize the operations of these reservoirs during the 1995 calendar year.

Lake Oroville began 1995 with 1,668,244 AF of storage, 761,694 AF less than it held at the beginning of 1994. Computed inflow peaked in March and storage in Lake Oroville peaked on June 24, 1995 at 3,534,575 AF (100 percent of normal maximum operating capacity) and ended the year at 76 percent of average or 2,702,081 AF. The net effect of operations and water conditions at Lake Oroville resulted in an increase in storage of 1,033,937 AF.

At the beginning of 1995, San Luis Reservoir held 1,196,575 AF, 59 percent of its normal maxi-

imum operating capacity (2,027,835 AF); the SWP held 709,001 AF, 67 percent of its maximum operating capacity (1,062,183 AF). SWP storage at the end of 1995 increased to 911,417 AF. End-of-year federal storage was 735,465 AF, for a year-end total of 1,646,882 AF.

At the beginning of 1995, Lake Del Valle held 25,737 AF (64 percent of normal maximum operating capacity). Highest end-of-month storage was in April at 40,376 AF (100 percent of normal maximum operating capacity). At year's end Lake Del Valle held 26,239 AF (65 percent of normal maximum operating capacity).

SWP southern reservoirs (Pyramid, Castaic, Silverwood, and Perris) have a combined maximum operating storage capacity of 701,320 AF. The total

combined storage of 486,116 AF at the beginning of 1995 increased to 577,353 AF by the end of the year.

The following tabulation compares normal operating capacity in the principal SWP reservoirs with end-of-year storage for 1994 and 1995:

Reservoir	Normal Maximum Operating Capacity	End-of-year Storage 1994	End-of-year Storage 1995
Lake Oroville	3,537,580	1,668,244	2,702,081
Lake Del Valle	40,000	25,737	26,239
San Luis Reservoir	1,062,183	694,184	911,417
Pyramid Lake	171,200	159,505	161,670
Silverwood Lake	74,970	69,932	38,977
Lake Perris	131,450	109,552	111,883
Castaic Lake	323,700	147,127	264,823
Totals	5,341,081	2,874,281	4,217,090

Water Deliveries and Aqueduct Operations

Generally, water diverted from the Sacramento-San Joaquin Delta is delivered to SWP storage facilities and to contractors through Banks Pumping Plant and Barker Slough Pumping Plant for a variety of beneficial uses. In addition to delivering entitlement water to long-term water supply contractors, SWP transports water to other public agencies through exchanges or purchases; provides water for wildlife and recreational uses; and conveys water to meet local water rights agreements. Historical information about water deliveries made to long-term contractors and other agencies through 1995 has been organized in Table 2.

For several years, DWR has offered contractors the opportunity to carry over a portion of their entitlement water approved for delivery in the current year for delivery during the next year. The carry-over program was designed to encourage the most effective use of water, and to avoid obligating the contractors to use or lose the water by December 31. Because operational constraints may change from year to year, an agreement in which the conditions of the approval are listed is signed each year with participating contractors. In 1995, SWP delivered 53,001 AF of entitlement water carried over from 1994 to six contractors. The Department also approved 140,687 AF of 1995-carryover water for delivery to six contractors in 1996.

The Monterey Agreement grew out of water allocation concerns that intensified during the 1987-1992 drought. Rather than negotiate only water allocation issues, the Department and water contractors decided on a major revision to SWP long-term contracts and

their administration-in essence, to update management of the SWP. The Monterey Agreement was released to the public December 16, 1994, in the form of 14 principles. *Bulletin 132-95, Chapter 1*, explains the Monterey Agreement in detail.

Make-up water is allocated to contractors according to Article 12(d) and Article 14(b) of the long-term water supply contracts. According to Article 12(d), if for some reason beyond DWR's control, water is not available for delivery according to the established schedule for that year, the water may be delivered at a later date. Article 14(b) of the long-term water supply contracts provides for the delivery of water at a later time if water is not delivered due to necessary investigations, inspections, maintenance, repairs, or replacement of SWP facilities. No make-up water as defined by Article 12(d) or Article 14(b) was delivered in 1995.

Under provisions of their water supply contracts, South Bay and San Joaquin Valley contractors may reduce entitlement water deliveries during years in which above-average amounts of local water are available and increase deliveries by an equal amount in later years. The Alameda County Flood Control and Water Conservation District-Zone 7 acquired 11,919 AF of wet-weather water credit in 1995 for a total of 123,499 AF of credits.

During 1995, SWP provided water service to 40 agencies, including 25 long-term water contractors. SWP facilities were used to convey non-project water for other agencies, including the CVP. In addition, SWP facilities were used to deliver water transfers, water purchased from the Drought Water Bank, and transfers from one agency to another. Transfers were accomplished according to agreements negotiated with USBR throughout the year and with participants of existing three-party contracts for the use of the Cross Valley Canal, a water conveyance facility that connects with the California Aqueduct in Kern County.

Total water deliveries through SWP facilities for 1995 totaled 4,069,745 AF. This total includes State contract deliveries of 2,002,557 AF, federal deliveries of 1,217,814 AF, Oroville Complex diversions of 848,837 AF, and Upper Feather River deliveries of 487 AF. State contract deliveries included a total of 1,904,764 AF of entitlement and entitlement-related water to 25 long-term contractors, plus 97,793 AF of other water. A graph showing the historical annual deliveries from SWP facilities, which includes deliveries of Federal water in the San Luis Field Division and Federal wheeling in the San Joaquin Field Division, is shown in Figure 1.

The following table is a summary of contract deliveries in 1995:

Entitlement Water		Other Water	
M&I	442,138	Operational Fld Rel	15,589
Agricultural	1,031,815	General Wheeling	667
M GW	154,085	Local Out	1,479
Bypass	73,002	Recreation (State)	2,575
Interruptible	64,330	Transfer Water	47,472
Carryover	48,501	Exchange Water	4,063
Benecia	9,064	Local Supply	25,948
Vallejo	6,829		
14B M&I	25,000		
Storage	50,000		
Total	1,904,764	Total	97,793
Total Water		2,002,557	

Amounts of 1995 water deliveries are shown by field division on Map 2, and include, entitlement water, permit water, local supply, recreation, purchases, federal and general wheeling, and water transfers. Totals by agency are shown in Table 2.

Significant Operational Activities

January

- A series of warm winter storms beginning on January 3 and extending through January 16 brought high flows to many California streams. In southern Santa Barbara County, DWR requested emergency assistance from the U.S. Army Corps of Engineers to clear debris from bridges. Storm drainage systems and small streams were overloaded by the intensity of the storms with over 2,000 homes inundated in Sacramento and Placer Counties. The storms caused sufficient runoff to require increased stream releases at Pyramid Lake, Silverwood Lake, and Lake Del Valle. Lake Oroville releases to the Feather River increased from 1,250 cfs at the beginning of the month to 12,000 cfs while Lake Oroville storage increased slightly over 1 MAF.
- DWR declared a flood mobilization beginning January 7. DWR's Flood Operations Center staff were on alert status for 11 days, forecasting river stages, acting as a central clearing house for flood related information, and warning local agencies and citizens of forecasted high water. DWR responded to about 25 incidents on and near the Sacramento River Flood Control Project.
- The upper Sacramento River high occurred in the area below Shasta Dam. The inflow to Lake Shasta, which peaked in excess of 100,000 cfs, was almost entirely stored, as was most statewide

runoff. Runoff during the month was more than two and one-half times average. The maximum release from Folsom Reservoir was 30,000 cfs, compared to 130,000 cfs in 1986.

- At the beginning of the month major in-state reservoirs were only 43 percent of capacity which is 75 percent of average for that date. By mid-January, storage had increased at least 4.5 million AF to around 90 percent of average. Storage continued to increase at a slower rate as storms subsided.

February

- Snowpack water content in the high mountains increased little during the month. Unseasonably warm weather near the beginning of the month and in the last week caused some melting of the lower elevation snow pack. Overall snow water content remained the same, estimated to be around 125 percent of the average April 1 accumulation.
- Runoff during February was near average for the month, with the seasonal statewide runoff since October at over 130 percent compared to 40 percent last year. Reservoir storage increased about 1 MAF to 105 percent of average. This is about 1.5 MAF more than one year ago. The increase was limited to the Sacramento Valley and on a couple of San Joaquin River region streams by the need to maintain adequate flood control space.
- The new Draft Water Quality Control Plan for the Bay-Delta established separate water supply indices for the Sacramento River and San Joaquin River regions, primarily for Delta water quality criteria. These are compound indices consisting of 40- 30-30 for the Sacramento region and 60-20-20 for the San Joaquin region. The first term is a percentage of forecasted April through July runoff for the four major rivers of each region, the second term is the percentage of October through March predicted (eventually actual) runoff, and the last term is the percentage of last year's index as a proxy carry-over parameter.

March

- In the Northern Sierra, March rainfall amounted to about 22-1/2 inches, making this the wettest March in 70 years of record and slightly exceeding that of March 1983 which had been the wettest year this century. Total seasonal precipitation now exceeded 160 percent of the average to date. Both Santa Barbara and San Luis Obispo counties were declared federal disaster areas while

experiencing extensive flooding from January and March storms.

- The peak rate of Sacramento Valley inflow to the Delta during the second week of March was around 330,000 cfs. DWR opened 22 of the 48 gates in the Sacramento Weir to help control lower Sacramento River levels. Tide levels at Rio Vista Bridge reached 9.8 ft on March 14, which is 1.8 ft over the warning stage. However, local agencies reported no major Delta levee problems.
- Statewide reservoir storage, which was near average last month, climbed to about 28 MAF, nearly 110 percent of average by April 1. Spill releases began on March 9 at Oroville and March 10 at San Luis. On March 11, DWR increased releases to the Feather River to 87,000 cfs. Spill releases at Oroville ended on March 27.
- Heavy runoff at Salt and Cantua Creeks caused considerable damage to the California Aqueduct when up to 4,000 cfs crested the operating road and flowed into Pool 18; at least 20 lining panels were destroyed. Record runoff of greater than 25,000 cfs into the Arroyo Pasajero impounding area resulted in releases of up to 3,000 cfs into the aqueduct through the Gale Avenue gates and 1,000 cfs under the aqueduct through the evacuation culvert. High water breached the embankment protecting the aqueduct and approximately 600 cfs flowed uncontrolled into Pool 20, displacing a number of lining panels. DWR opened the Kern River Intertie on March 11 to prevent overtopping from within the aqueduct due to the uncontrolled inflows from the Arroyo Pasajero and Cantua Creek area. Releases through the Intertie reached 5,500 cfs on March 12. By March 14, operators concluded releases through the Kern River Intertie. The high flows in the Arroyo Pasajero washed out a bridge on Interstate 5 and severed an 18-inch Chevron Oil Company pipeline 1-1/4 miles downstream of Interstate 5 and approximately 200 barrels of crude oil leaked into the arroyo before it could be shut down. The oil was carried into the ponding basin where a small amount was taken into the aqueduct through the breach. High flows also carried some oil east of the aqueduct through the evacuation culvert. Water quality personnel detected no oil in the samples taken south of checks 21 and 29 or in the Quail Lake vicinity.
- Field personnel discovered a leak at Aqueduct Pool 49 on the East Branch near Quartz Hill on March 10. The leakage stopped when the aqueduct water surface was lowered on March 11, however significant erosion had already occurred in the left embankment. The pool was dewatered

to inspect the leak; a repair scheme developed and repairs begun under an emergency contract.

April

- April 1 snowpack water content was 175 percent, compared with 50 percent at this time last year. Runoff statewide was three times average, compared to less than half average for this month last year. The water year runoff total climbed from 130 percent at the end of February to 170 percent by the end of March.
- Runoff during April was about 1.5 times average, down considerably from March but much more than last year's 44 percent for the month and 40 percent for the season to date. The seasonal statewide total runoff this water year to May 1 remained around 170 percent of average.
- The Delta remained in excess conditions throughout the month of April. The Delta out-flow index averaged 90,743 cfs-days and peaked at 115,001 cfs-days.

May

- Statewide runoff during May was between 180 and 190 percent of average. Northern Sierra precipitation was about 4-1/2 inches, more than twice the monthly average. Renewed overflow into the Sacramento River floodway bypass system occurred during the first half of May. Overflow depths at Fremont Weir into Yolo Bypass reached 2-1/2 ft on May 4. This was considerably more than the 1 foot of overflow in May of 1983; the last time May overflow occurred. To regulate runoff peaks within safe channel conveyance capacities, excess snowmelt runoff was spilled at all major foothill reservoirs (up to 60,000 cfs at Oroville), except on the Stanislaus River.

June

- Hot weather during the last week of June generated near-peak daily snowmelt runoff for the season in the southern Sierra. Runoff was 220 percent of average for the month, boosting statewide seasonal totals (since October 1) to 175 percent of average compared to only 40 percent last year.

July

- Peak runoff caused the lower San Joaquin River and some tributaries to rise to near or above flood warning stage during the second week of July. As the month ended, river flows had decreased greatly, but remained much above average for this time of year. End of month flows in the San Joaquin River near Vernalis were about 7,000 cfs; average is about 1,500 cfs.

August

- Statewide seasonal precipitation remains about 170 percent of average compared to 65 percent last year.
- The Operations Control Office moved to the Joint Operations Center at El Camino and Watt Avenues along with USBR, Flood Management, and the U.S. Weather Service.

September

- There was little rainfall in California during August and September. Statewide precipitation remained at 170 percent of average, compared to only 65 percent for water year 1994 and 140 percent in 1993. Northern Sierra water year precipitation was over 85 inches, around 170 percent of average, compared to 64 percent in 1994 and 131 percent in 1993.
- Runoff in the four main rivers of the San Joaquin River region was 215 percent of the 50-year average. San Joaquin River flow at the Vernalis gage ran around 6,000 cfs in late September. This is nearly four times average for the month of September.
- Thermalito Afterbay water surface level was lowered to below elevation 124 ft to construct a duck brood pond. Construction began about October 15. The draw down of California Aqueduct Pool 49 for lining and embankment repairs began on September 30.

October

- October was quite dry except on the North Coast. Statewide runoff for the month was a little below average. Last year's October runoff was about 60 percent of average. Sacramento River unimpaired runoff in water year 1995 was 33.9 MAF, 184 percent of the 50 year average runoff of 18.4 MAF. This was the second wettest year since records began in 1906; only 1983, at 37.7 MAF, was wetter.

- The East Branch Aqueduct continued to be out of service while repairs to the aqueduct lining in Pool 49 were completed. This outage corresponds with the drawdown of Lake Silverwood from 53,808 to 43,295 AF of storage; a fourteen-foot drop in surface elevation. This was done in preparation of construction work on the new San Bernardino Tunnel Intake Tower.

November

- Pool 7 of the California Aqueduct was dewatered in preparation for repairing about 1,500 lineal ft of cracked lining. Repairs to the aqueduct lining in Pool 49 (East Branch in Southern California) were completed in November.
- DWR performed a study, which began in October and ended in January of 1996, on the "low-flow section" of the Feather River (between the Diversion Dam and the Thermalito Afterbay river outlet). The flow was kept at 1,600 cfs during the study, which is 1,000 cfs above the average flow.
- In spite of November being the non-irrigation season, excess Feather River releases were allowed to be diverted to Western Canal. The water was used to enhance duck habitats.

December

- On December 1, DWR approved 2.23 MAF of entitlement water for delivery in 1996 to long-term SWP contractors.
- In the second week of December, the most powerful Pacific storm in over a decade brought strong southerly winds and much rain to northern California. Initially, the storm was relatively warm with rain at higher elevations. In its later phase, snow levels lowered and the mountain snowpack increased from nearly zero to about half the seasonal average. December precipitation in the Northern Sierra was about 135 percent of average for the month.

Energy Operations

Energy Resources

Energy generation from SWP's seven hydroelectric plants (Hyatt, Thermalito, Gianelli, Warne, Castaic, Alamo, and Devil Canyon) during 1995 totaled 4,759,035 MWh, as illustrated in Figure 3.

The SWP receives energy under contract from five small hydroelectric facilities (total capacity of 30 MW) owned and operated by MWDSC. In 1995, these plants furnished 109,311 MWh of energy to the SWP. DWR has exchange arrangements with Southern California Edison and the Los Angeles Department of Water and Power to provide transmission of this energy.

The DWR-SCE Power Contract has been in effect since April 1983. Under this contract, part of the Hyatt Thermalito Power plants' generation and all of the output of Devil Canyon Power Plant and Alamo Power Plant are delivered to SCE. The energy is generally delivered during on-peak periods and a greater amount of energy is returned during off-peak periods. SCE combined return and additional to the SWP during 1995 was 2,315,634 MWh.

Long term contracted energy purchases, such as Tera Corp. and MWD Hydro, are itemized separately in Table 3. Other purchases totaled 692,793 MWh from various utilities, such as Pacific Power and Light and Salt River Project.

Since July 1983, the Department has received energy from Reid Gardner Powerplant, a coal-fired facility near Las Vegas, Nevada. Reid Gardner consists of four units. The Department owns 67.8 percent of Unit 4 (169.5 MW based on nameplate capacity of 250 MW), while Nevada Power Company owns the remainder of Unit 4 as well as all of units 1, 2, and 3.

The market rates for nonfirm energy sales in most of 1995 were below Reid Gardner Unit 4 energy production rates. To minimize economic losses, the Department and NPC entered into two agreements in 1995. From February 11, 1995, through April 30, 1995, the Department and NPC agreed to shut down Unit 4 since both parties did not need its power during this period. The plant remained shut down for scheduled normal annual maintenance in May 1995. From June 1, 1995, through September 22, 1995, NPC and the Department entered into an agreement providing NPC the sole use of Unit 4, since NPC needed the energy to meet high-energy demands during the hot summer months.

Energy Loads

Energy load data (total energy used by the SWP) is summarized in Table 4, and Figures 5 and 6. For the purposes of balancing energy resources and loads, this report itemizes those amounts required to balance internal SWP supplies and demands separately from those amounts required to meet total DWR supplies and demands. Besides SWP energy loads of 4,003,983 MWh, total DWR energy loads include sales of 5,322,944 MWh, losses of 235,979 MWh, and deviation adjustments of 6,285 MWh, for a total of 9,569,191 MWh.

The San Joaquin Field Division, which includes the only stretch of Aqueduct with no reservoirs, accounted for over half of the total project energy load. Included in this amount is 1,270,548 MWh used at Edmonston Pumping Plant with peak pumping occurring in August.

In 1995, the Department sold power to 33 agencies, resulting in revenues of over \$76.5 million. The largest sale was 956,955 MWh to Portland General Electric.

Sacramento - San Joaquin Delta Operations

The Sacramento-San Joaquin Delta provides about one-half of the State's water supply. The Delta is an estuary, a constantly changing area where tidal and river currents meet, and where salinity is between the extremes of brackish and fresh waters. The estuary provides habitat for fish and wildlife, including waterfowl on the Pacific Flyway.

Many of the problems facing the Delta today, such as saltwater intrusion and oxidation of peat soil, have plagued the area for many years. Originally a tidal marshland covered with tules, the Delta, during dry summer months, has always been subject to intrusions of salty ocean water from the San Francisco Bay.

Today, dams upstream of the Delta, including SWP's Oroville Dam and CVP's Shasta Dam, help control the intrusion of salt water by releasing fresh water into the Delta during dry periods in summertime. However, problems with salinity in the Delta still exist

Governor Wilson's 1992 policy to "fix the Delta" led to the State-Federal Framework Agreement, signed in June 1994, and the Bay-Delta Accord signed December 15, 1994. Bulletin 132-95, Chapter 1, explains both the State-Federal Framework Agreement and the Bay-Delta Accord in detail.

Net Delta Outflow Index

Delta outflow is not measured directly due to the major tidal influence in the Delta. Instead an index of Delta outflow is calculated using measured inflows, exports, and estimated in-Delta water use. A new method of calculating Delta outflow was introduced in the 1995 Principles for Agreement on Bay-Delta Standards. This new index, the Net Delta Outflow Index, considers inflows of the Yolo Bypass system, the eastside stream system

(the Mokelumne, Cosumnes, and Calaveras rivers), San Joaquin River at Vernalis, and Sacramento Regional Wastewater Treatment Plant. Major Delta exports and the estimated in-Delta water use are deducted from the cumulative inflow total to produce the index. The NDOI became effective for use in Delta standards compliance on January 1, 1995. Table 5 shows the computed daily NDOI for 1995.

The NDOI calculated flows cannot be directly compared to the prior Delta Outflow Index, as the Sacramento River bypass flows and several eastside stream flows were not included in the earlier DOI calculations. Those flows can be quite substantial during high flow periods. In 1995, the Yolo Bypass flows contributed 22 percent of total Delta inflow and, during the extremely high flow events of March, contributed over 60 percent of inflow. A comparison of Delta Inflow and NDOI is plotted on Figure 7. Gross channel depletion is the sum of evapotranspiration and net increase in soil moisture of Delta lands plus evaporation from Delta channels.

The 1995 daily NDOI averaged 54,416 cfs for the year and was 47,294 cfs more than the 1994 daily average. The greatest mean monthly DOI occurred in March, at 175,359 cfs and the greatest mean daily was 353,194 cfs on March 13. The lowest monthly DOI occurred in November (9,321 cfs) and the year's lowest daily DOI was on October 29 with only 3,168 cfs.

D-1485 standards set a minimum NDOI at Chipps Island for adequate water for fisheries. All NDOI and river flow standards were met in 1995.

Project Operations by Field Division

Oroville Field Division

Water Storage

SWP water storage facilities in the Oroville Field Division include Lake Oroville, Thermalito Forebay and Afterbay (Oroville-Thermalito Complex) and upper Feather River reservoirs consisting of Lake Davis, Frenchman Lake, and Antelope Lake. Lake Oroville stores winter and spring runoff for later SWP use for power generation, flood control, recreation, fish and wildlife enhancement, and water supply.

The Upper Feather River Reservoirs have a combined capacity of 162,000 AF. Capacities and monthly storage for the three Upper Feather River reservoirs are presented in Table 7. The table below shows the largest end-of-month storage for each reservoir for the last five years:

	Reservoir (Capacity)		
	Antelope 22,566	Frenchman 55,477	Davis 84,371
Year			
1995	(Apr) 25,242	(Apr) 58,172	(May) 84,331
1994	(May) 19,686	(Mar) 32,770	(Apr) 63,089
1993	(Apr) 23,895	(May) 39,814	(Jun) 68,908
1992	(Apr) 17,596	(Feb) 15,580	(Mar) 40,008
1991	(May) 22,048	(Apr) 22,590	(Apr) 48,902

The total amount of unimpaired runoff to Lake Oroville for the 1994-95 water year totaled about 9.24 MAF, (204 percent of average). Lake Oroville's computed inflow is tabulated in Table 8 and plotted along with releases, diversions, and storage withdrawals in Figure 11. A ten-year historical summary of Lake Oroville's storage and inflow is illustrated in Figure 12. Lake Oroville storage on January 1, 1995 was 1,668,244 AF. Storage peaked on June 24, 1995, at 3,534,575 AF, 100 percent of normal maximum operating capacity. Lowest storage in Lake Oroville in 1995 was 1,667,686 AF on January 6. By December 31, 1995, storage was at 2,702,081 AF, 76 percent of normal maximum operating capacity.

Water temperatures on and below the lake's surface are monitored very closely throughout the year at various locations around the lake. Two intakes to the

powerplant have shutters that control the depth from which water enters the plant. Adding or removing shutters as necessary can control the temperature of water entering the fish hatchery. A complete illustration of water temperature and intake operation is shown on Figure 14.

Water Deliveries

Project water stored in the Upper Feather Area lakes flows into Lake Oroville through the North and Middle Forks of the Feather River. Contract deliveries totaled 9,227 AF to Plumas County Flood Control and Water Conservation District and Last Chance Creek Water District. Non-project deliveries (prior water rights) totaling 487 AF were made out of Lake Davis.

Water stored in Lake Oroville is released into the Thermalito Diversion Dam Pool, from which specified quantities are released into both the Feather River and the Thermalito Power Canal. The power canal supplies water first to the Thermalito Forebay and then to Thermalito Afterbay. From the Thermalito Afterbay, additional water is released to the Feather River and several local distribution systems used to deliver water to prior water right holders. These deliveries are collectively called the Feather River Service Area diversions. FRSA diversions pre-date the SWP construction, and would have occurred in the absence of the SWP to the limit of available natural river flows. Nearly all FRSA diversions are for agricultural use and totaled 848,837 AF in 1995, 13,882 AF less than in 1994. FRSA diversions are detailed below:

Sutter Butte Canal	474,070
Richvale Canal	116,940
Sunset Pumps	5,090
Western Canal Lateral	3,605
Western Canal	217,230
Tudor Mutual	2,621
Garden Highway	14,741
Plumas Mutual	7,642
Oswald Water District	788
Palermo Canal	6,110
Total in AF	848,837

Delta Field Division

Water Storage

The Delta Field Division consists of the North Bay Aqueduct, the South Bay Aqueduct, and the California Aqueduct from Clifton Court Forebay to Check 12. Water storage operations take place at Clifton Court Forebay, Bethany Reservoir, Travis Tank, Napa Terminal Tank, the California Aqueduct, and Lake Del Valle.

Releases from Lake Del Valle into the Aqueduct occurred in both the spring and the fall and are detailed in Table 11. Inflow and storage changes for the last ten years at Lake Del Valle are shown in Figure 15.

Project water flows from the Delta into Clifton Court Forebay through the Clifton Court control gates. A schedule of daily gate operation is published in the SWP Monthly Report of Operations. Monthly inflows to Clifton Court Forebay along with corresponding storage changes are shown in Table 11.

Water Deliveries

The Delta Field Division delivered 126,067 AF of water in 1995. These and other deliveries are summarized in Table 2.

The North Bay Aqueduct system, completed in May 1988, begins in the North Delta at Barker Slough. Sacramento River water is conveyed through Cache, Lindsey, and Barker sloughs to the Barker Slough Pumping Plant. From the pumping plant, water is conveyed by pipe for 24 miles northwest to contractors in Napa and Solano Counties and to the Cordelia Pumping Plant. Deliveries are made to Solano County water users via turnouts along the way. From the Cordelia Pumping Plant, the North Bay Aqueduct terminates at the Napa Terminal Tank. The Aqueduct delivered 26,527 AF to Napa and Solano counties.

A division-wide total of 108,336 AF was delivered to SWP entitlement contractors, 14,233 AF of Local Water was conveyed to Alameda County Flood Control and Water Conservation District, Zone 7, and to

the Alameda County Water District, 2,472 AF of Operational Flood Release water to Alameda County Flood Control and Water Conservation District, Zone 7, and to the Alameda County Water District, 213 AF of Federal Wheeling to Musco Olive and the V. A. Cemetery, 667 AF of General Wheeling to Alameda County Flood Control and Water Conservation District, Zone 7, and 146 AF of Recreation water.

Pumping Plants

Delta Field Division pumping plants include Barker Slough Pumping Plant and Cordelia Pumping Plant on the North Bay Aqueduct, Banks on the California Aqueduct, and South Bay and Del Valle Pumping Plants on the South Bay Aqueduct. Monthly pumping data is summarized for the year in Table 1.

Banks Pumping Plant was originally built to accommodate 11 units. Initially, seven pumps were constructed for a total pumping capacity of approximately 6,400 cfs. Construction of the final four pumps was completed in 1990, each with a design capacity of 1,067 cfs and a new total capacity of about 10,500 cfs. Export pumping rates are typically increased on weekends to take advantage of less costly off-peak electricity (producing sharp peaks in the export rate at about 7-day intervals).

In 1995, the SWP diverted 2,116,879 AF of water at Banks Pumping Plant, including 28,417 AF of CVP water wheeled by the Department. Below is a five-year summary of federal, State, and total pumping at Banks:

Pumping at Banks Pumping Plant			
(in AF)			
Year	Federal	State	Total
1995	28,417	2,088,462	2,116,879
1994	44,984	1,621,129	1,666,113
1993	196,169	3,013,955	3,210,124
1992	34,816	1,467,844	1,502,660
1991	51,642	1,643,819	1,695,461

San Luis Field Division

Water Storage

San Luis Reservoir reached its maximum end-of-month storage for 1995, 2,034,447 AF, in March. Maximum operating storage capacity in San Luis is 2,027,835 AF. Minimum end-of-month storage for the year, 1,499,314 AF, occurred in August. The State's end-of-month share of San Luis Reservoir storage reached a maximum of 1,171,880 AF in February, and a minimum of 911,417 AF was reached in December. Table 13 and Figure 16 show San Luis Reservoir operations during 1995.

There are two different accounting procedures for calculating storage shares in O'Neill Forebay. One adjusts storage shares using actual SWP/USBR deliveries made from water out of O'Neill. The other method adjusts storage shares in O'Neill using amounts pumped for each agency derived from scheduled energy. Since scheduled pumping and water deliveries never match, there is always a difference that is carried over into subsequent months. These mis-matches are used to "underschedule" or "overschedule" energy and pumping in order to bring the mis-match back into alignment or closer to zero. In 1995 the State's share of O'Neill was always over-drawn. It has subsequently been returned to and maintained at near zero.

Pumping and Generating Plants

Total pumping in 1995 at Gianelli Pumping-Generating Plant was 1,464,142 AF. Water released from San Luis Reservoir to O'Neill Forebay for generation was 854,077 AF. Total pumping at Dos Amigos Pumping Plant in 1995 was 3,172,635 AF, about 379,364 AF more than was pumped in 1994. Table 15 summarizes joint-use plant activity on a monthly basis.

Water Deliveries

Federal deliveries from the joint-use facilities in the San Luis Field Division during 1995 totaled 1,207,876 AF. SWP water deliveries in the San Luis Field Division during 1995 included 1,305 AF of State and federal deliveries to the DFG and the Department of Parks and Recreation (DPR) from the O'Neill Forebay area and San Luis Reservoir (Reach 3) The following tabulation details the components of these recreation deliveries:

O'Neill Forebay and San Luis Reservoir (Reach 3)			
	DPR	DFG	Total
State	67	597	664
Federal	54	587	641
Sub-total	121	1,184	1,305
Pools 16, 17, & 18 (Reach 5)			
	DPR	DFG	Total
State	0	0	0
Federal	0	0	0
Sub-total	0	0	0
Total	0	0	0

San Joaquin Field Division

Water Deliveries

A total of 1,326,961 AF of deliveries were made in the San Joaquin Field Division in 1995. Water types include entitlement water, operational flood release, carryover entitlement, and transfer water. Kern County Water Agency (KCWA) represented 85 percent of the total SWP water delivered within the Division.

In March 1995, the California Aqueduct was inundated by flood flows in the Arroyo Pasajero area (Reach 6, Milepost 152). In response, SWP requested nearby contractors to divert these flows to their service areas to reduce damage to the aqueduct. KCWA diverted 13,117 AF of operational flood release water from reaches 10A, 12E, and 13B.

In addition to SWP deliveries, 9,725 AF of federal water was wheeled through SWP facilities to be delivered to the Kern National Wildlife Refuge.

The second phase of the Coastal Branch of the California Aqueduct was nearing completion. Upon

completion, the Coastal Branch will have the capacity to transport about 50,000 AF annually to San Luis Obispo and Santa Barbara counties.

The San Joaquin Field Division is the only field division in the SWP where there are no water storage facilities. All deliveries are made from the Aqueduct and are summarized in Table 22. Deliveries are totaled by agency and water type in Map 2 and Table 2.

Pumping Plants

Pumping plants in the San Joaquin Field Division include Las Perillas and Badger Hill on the Coastal Aqueduct, and Buena Vista, Teerink, Chrisman, and Edmonston on the California Aqueduct. A complete monthly summary of amounts pumped at these plants is shown on Table 1. A summary of energy used to pump at each plant is shown on Table 4.

During 1995, 1,951,778 AF of State water and 9,725 AF of federal water flowed past Check 21 into the San Joaquin Field Division. Edmonston Pumping Plant pumped 563,704 AF of water south in 1995.

Southern Field Division

Water Storage

There are four storage reservoirs in the Southern Field Division (Pyramid, Castaic, Silverwood, and Perris) with a combined storage capacity of 701,320 AF. Combined storage at the beginning of the year was 486,116 AF. End-of-year combined storage was 577,353 AF. Complete monthly operation tables for all four reservoirs plus Elderberry Forebay and Castaic Lagoon, along with historical inflow and storage data for the last ten years, is summarized in Tables 16 through 21 and Figures 17 through 20.

Water Deliveries

SWP deliveries in the Southern Field Division totaled 546,088 AF. Eleven agencies received the water, which was almost all entitlement water. Two exceptions were 1,669 AF of recreation water to the California Department of Parks and Recreation at Lake

Perris, Silverwood Lake, Pyramid Lake and Castaic Lagoon and 1,479 AF of local water to the Los Angeles Department of Water and Power.

Pumping and Generating Plants

Pumping plants in the Southern Field Division include Oso and Castaic on the West Branch, and Pearblossom on the East Branch. A complete monthly summary of amounts pumped is shown on Table 1. A summary of energy used to pump and station service energy at each plant is shown on Table 4.

Generating plants in the Southern Field Division include Warne and Castaic on the West Branch, and Alamo and Devil Canyon on the East Branch. Energy available from each generating plant is summarized in Table 3. Combined generation at all four plants totaled 787,599

Table 1. Project Pumping by Plant
1995
(in acre-feet)

Pumping Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt*	46,182	1,602	10,079	3,385	625	0	1,796	5,749	317	0	29,109	6,469	105,313
Thermalito*	40,265	780	16,309	4,269	1,121	0	3,306	8,392	0	0	44,686	8,046	127,174
Barker Slough	1,739	1,328	929	2,205	1,172	2,326	4,045	3,334	2,972	3,013	2,609	1,763	27,435
Cordelia	1,121	1,173	430	1,283	787	1,914	2,614	2,739	2,551	2,597	2,309	1,557	21,075
Banks													
State	458,420	257,176	30,927	7,949	77,061	199,115	336,009	289,801	169,088	181,231	79,050	2,635	2,088,462
Federal	0	0	0	0	0	0	28,417	0	0	0	0	0	28,417
Total	458,420	257,176	30,927	7,949	77,061	199,115	364,426	289,801	169,088	181,231	79,050	2,635	2,116,879
South Bay	1,493	263	1,584	4,520	5,538	9,570	11,552	11,876	6,769	6,764	4,952	1,427	66,308
Del Valle	8,547	3,551	27,752	1,809	2,065	280	0	0	3,837	4,620	1,915	2,582	56,958
Gianelli* 1/													
State	381,272	81,310	-123	-83	-77	23,226	49,428	45,671	22,190	62,479	52,030	997	718,320
Federal	218,157	162,793	11,174	7,629	15,483	662	0	0	48,919	75,020	93,720	112,265	745,822
Total	599,429	244,103	11,051	7,546	15,406	23,888	49,428	45,671	71,109	137,499	145,750	113,262	1,464,142
O'Neill* 2/													
State	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal	243,148	177,133	118,321	168,715	140,114	140,827	145,966	36,692	109,443	119,590	175,247	218,375	1,793,571
Total	243,148	177,133	118,321	168,715	140,114	140,827	145,966	36,692	109,443	119,590	175,247	218,375	1,793,571
Dos Amigos 1/													
State	81,774	134,889	122,396	110,594	128,398	229,767	303,328	315,321	165,650	106,578	153,788	134,351	1,986,834
Federal	3,835	63,793	19,573	66,649	99,266	206,424	269,111	228,058	50,974	46,041	45,051	87,026	1,185,801
Total	85,609	198,682	141,969	177,243	227,664	436,191	572,439	543,379	216,624	152,619	198,839	221,377	3,172,635
Las Perillas	985	1,689	3,466	5,884	10,193	16,992	20,615	17,530	7,426	7,124	6,095	3,523	101,522
Badger Hill	1,054	1,802	3,580	6,072	10,547	17,920	21,340	18,280	7,784	7,372	6,399	3,657	105,807
Buena Vista	18,533	24,885	81,378	59,161	58,773	92,919	117,914	123,254	77,659	14,668	27,409	29,390	725,943
Teerink	18,108	24,013	81,742	53,487	49,914	73,034	92,771	96,169	70,377	10,439	24,568	26,150	620,772
Chrisman	17,476	23,584	81,057	51,955	45,333	66,453	85,997	89,551	66,070	7,739	22,346	24,681	582,242
Edmonston	17,385	23,134	80,303	51,148	44,009	63,487	81,930	86,614	64,003	6,404	20,748	24,539	563,704
Pearblossom	8,630	9,440	7,016	36,208	30,593	39,054	53,583	61,096	38,132	93	5,652	17,350	306,847
Oso	7,833	11,806	73,796	10,780	5,851	15,218	15,935	14,655	18,305	4,523	11,962	4,043	194,707
Castaic* 3/	0	11	51	6,322	15,247	64,559	53,906	71,751	35,462	0	14,564	44,005	305,878

1/ Joint state-federal facility.

2/ O'Neill Pumping Plant is a federal facility

3/ Castaic Pumping Plant pumps water for the city of Los Angeles.

* Pumping-generating plants. This table includes only the pumping portion of operations of these plants.

Table 2. Water Deliveries 1962-1995

(in acre-feet)

Agency	1962-1990	1991	1992	1993	1994	1995	TOTALS
Oroville Field Division							
Last Chance Creek W.D.	191,606	7,010	4,988	10,879	8,921	8,919	232,323
Plumas Co. F.C. & W.C.D.*	7,732	420	485	444	492	308	9,881
County of Butte*	6,394	328	117	256	329	203	7,627
Thermalito I.D.	23,940	2,124	2,315	2,096	2,318	2,321	35,114
Prior Water Rights Deliveries 1/	18,451,546	558,143	608,692	811,435	863,831	849,324	22,142,971
Yuba City*	1,786	265	642	746	1,035	910	5,384
Delta Field Division							
Napa CO. F.C. & W.C.D. *	125,058	10,018	5,510 5/	5,286	6,792	5,182	157,846
Alameda Co. W.D.*	533,268	30,126	24,250	14,909	22,911	23,085	648,549
A.C.F.C. & W.C.D., Zone 7*	446,945	14,101	23,084	43,390	37,190	42,171	606,881
Pleasanton Township W.D.	674	0	0	0	0	0	674
Santa Clara Valley W.D.*	1,549,979	87,253	42,839	62,065	69,495	28,756	1,840,387
Marin W.D.	4,594	0	0	0	0	0	4,594
San Francisco W.D.	4,677	51,135	21,255	5,219	0	0	82,286
Skylonda M.W.D.	10	0	0	0	0	0	10
Oak Flat W.D.*	128,774	1,472	2,239	2,858	3,831	5,169	144,343
Mustang W.D.	4,256	0	0	0	0	0	4,256
Granite Construction	120	0	0	0	0	0	120
Lake Del Valle (E.B.R.P.D.)	2,002	150	147	143	168	146	2,756
Orestimba Creek	100	0	0	0	0	0	100
Recreation Fish and Wildlife	0	0	0	0	4,397	0	4,397
CVP Water	4,920	77	154	208	211	213	5,783
Solano Co. F.C.W.C.D.*	53,645	24,527	26,086	29,806	30,990	21,345	186,399
San Luis Field Division							
Dept. Parks & Rec. (STATE)	715	59	72	66	77	67	1,056
Dept. Fish & Game (STATE)	6,426	110	391	724	640	651	8,942
Fed. Customers (Rec.+ Joint-Use)	24,161,794	504,297	541,473	943,200	960,626	1,207,876	28,319,266
Fed. Customers (Misc.)	247,758	114	95	76	108	50	248,201
Westlands Water District	10,900	0	0	0	0	0	10,900
San Joaquin Field Division							
Tulare Lake Basin W.S.D.*	2,533,953	2,180	78,558	123,290	85,029	139,869	2,962,879
Empire West Side I. D.*	78,682	221	1,354	2,741	1,666	1,631	86,295
County Of Kings*	51,900	0	1,806	4,000	2,116	4,000	63,822
Hacienda W.D. 2/	75,895	0	0	0	0	0	75,895
Kern County Water Agency*	17,532,422	223,928	446,625	1,081,231	700,996	1,066,723	21,051,925
Kern Water Bank 4/	7,501	0	0	0	0	0	7,501
Dudley Ridge Water District*	1,232,998	14,454	13,945	23,418	32,419	45,485	1,362,719
Devils Den Water District	339,231	716	0	0	0	0	339,947
J.G. Boswell	117,430	0	0	0	0	0	117,430
Shell Cal Prod. 3/	85,914	0	0	0	0	0	85,914
Green Valley Water District	11,054	0	0	0	0	0	11,054
Federal Wheeling	1,112,127	23,845	34,154	12,552	48,370	9,725	1,240,773
Castaic Lake Water Agency*	0	0	0	4,157	9,422	9,486	23,065
M.W.D. Of S.C.	92	0	0	50,000	0	50,000	100,092
Wheeler Ridge W.S.D.	0	0	0	0	0	0	0
Department of Fish and Game	0	0	0	0	0	42	42
Southern Field Division							
A.V.E.K. W.A.*	673,019	8,607	31,927	43,102	50,552	48,513	855,720
M.W.D. Of S.C.*	11,357,072	606,447	716,250	602,190	807,946	386,042	14,475,947
Littlerock Creek I. D.*	9,224	522	251	734	1,098	480	12,309
Mojave Water Agency*	57,815	2,032	9,334	11,734	16,253	7,495	104,663
Desert Water Agency*	373,400	11,430	17,197	38,100	23,257	38,100	501,484
Coachilla Valley Water District*	233,832	6,930	10,427	23,100	14,102	23,100	311,491
Crestline-Lake Arrowhead Water Agency*	23,861	1,561	264	946	1,193	884	28,709
San Gabriel Valley M.W.D.*	118,431	5,399	11,971	14,397	15,230	12,922	178,350
San Bernardino Valley M.W.D.*	242,339	7,177	5,113	6,552	9,135	696	271,012
Santa Barbara	0	1,240	0	0	0	0	1,240
Dept. Parks & Rec., L.A. Co. Rec. Dept.	49,308	4,560	1,995	1,676	2,918	1,669	62,126
Piru Creek Fish Enhancement	2,915	0	0	0	0	0	2,915
Castaic Lake Water Agency*	142,705	7,357	14,812	13,787	14,919	17,747	211,327
Palmdale Water District*	29,420	3,914	4,035	7,761	8,418	6,961	60,509
United Water C.D. (Local Supply)	998	0	0	0	0	0	998
Ventura County FCD*	4,836	988	0	0	0	0	5,824
Los Angeles Dept. of Water and Power	0	0	16	0	0	1,479	1,495
Lilico Pictures	10	0	0	0	0	0	10
Totals	82,484,491	2,225,237	2,704,868	3,999,274	3,859,401	4,069,745	99,132,672

* Long-term contractors

1/ Includes Thermalito Afterbay, Palermo Canal, Upper Feather lakes deliveries.

2/ Hacienda Water District was annexed by Tulare Lake Basin WSD in 1981.

3/ Repayment of preconsolidation water.

4/ Advance storage of ground water, by agreement between KCWA and DWR

5/ Includes 237 AF of Vallejo Permit water transferred to Napa.

Table 3. SWP Power Resources
1995

(in megawatt-hours)

Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt-Thermalito 1/	195,787	396,768	452,975	464,888	498,362	490,316	271,232	304,381	292,479	149,932	125,742	233,661	3,876,523
Bottle Rock	72	0	0	0	0	0	0	0	0	0	0	0	72
Gianelli													
State	0	0	2,076	-29	3,783	8,522	10,170	10,042	3,253	1,546	25,771	29,779	94,913
Federal	0	0	0	800	3,360	30,034	27,030	61,059	2,341	0	0	0	124,624
Total	0	0	2,076	771	7,143	38,556	37,200	71,101	5,594	1,546	25,771	29,779	219,537
CEA Energy 2/	34,380	29,900	32,610	33,770	36,700	30,000	43,000	43,000	28,500	42,000	38,500	20,140	412,500
Warne 3/	3,396	6,391	43,403	6,491	3,366	8,851	9,610	9,489	10,253	2,718	7,403	2,199	113,570
Castaic	14,711	18,312	91,631	19,920	7,824	15,744	16,680	16,440	16,800	4,248	10,800	5,032	238,142
Alamo	338	653	329	864	3,527	3,513	4,010	5,618	5,260	0	763	2,264	27,139
Devil Canyon	12,351	14,252	15,395	35,281	39,840	48,272	64,725	74,706	62,934	13,811	9,801	17,380	408,748
Tera Corp.	96	1	60	163	387	147	241	138	14	0	0	0	1,247
MWD Hydro	6,156	4,508	5,478	9,793	11,694	9,199	11,739	12,153	11,522	8,716	8,880	9,473	109,311
Reid Gardner	76,729	18,532	0	0	0	0	0	0	360	89,148	110,498	98,525	393,792
Pine Flat	0	0	12,595	117,238	121,815	128,180	154,902	126,349	54,868	43,056	1,206	191	760,400
Purchases 4/	68,536	45,630	62,405	51,025	46,400	44,919	60,142	49,150	38,700	68,085	70,176	87,625	692,793
Other Resources/Exchanges 5/	8,335	999	12,521	1,205	5,113	7,507	11,600	12,544	10,051	18,589	24,186	7,757	120,407
SCE Return Additional	171,187	221,410	112,052	70,679	73,035	67,577	269,944	279,973	317,704	283,613	231,836	220,624	2,319,634

1/ Includes Table Mountain and Hyatt out adjusted to Tesla.

2/ Entitlement energy supplied to SCE under several long-term contracts.

3/ Includes station-service energy.

4/ Includes Salt River Project; City and County of San Francisco; Southern California Edison; Bonneville Power Authority; Pacific Gas and Electric; Portland General Electric; Western Area Mid Pacific; City of Colton; Pacific Power and Light; Enron Power Marketing Inc.; Electric Clearing House, Inc.; Metropolitan Water District; and Puget Sound Power and Light.

5/ Includes Southern California Edison, Western Area Mid-Pacific, and actual deviation.

State:	9,569,191
Federal:	124,624
Total Project:	9,693,815

Table 4. Total Energy Loads
1995

(in megawatt-hours)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt-Thermalito 1/	33,932	738	9,740	3,298	683	28	2,073	6,098	338	31	28,280	6,090	91,329
North Bay 2/	864	482	614	576	816	654	2,114	1,742	1,330	1,540	1,636	624	12,992
Banks													
State	131,532	74,098	9,313	2,794	22,260	57,211	95,439	82,644	48,004	51,928	23,207	1,006	599,436
Federal	0	0	0	0	0	0	8,440	0	0	0	0	0	8,440
South Bay	1,210	437	1,508	3,755	4,658	7,912	9,421	9,762	5,842	5,474	3,923	1,247	55,149
Del Valle	21	19	21	6	5	6	7	6	7	6	6	6	116
Bottle Rock 3/	73	62	81	67	60	51	52	52	48	50	46	47	689
Gianelli													
State	130,468	35,508	522	520	457	9,271	19,631	16,296	7,672	21,976	19,013	685	262,019
Federal	74,384	70,396	4,605	2,994	6,326	408	0	0	16,305	25,487	33,796	39,393	274,094
Dos Amigos													
State	7,895	16,013	11,390	11,618	12,027	25,942	37,238	35,836	19,874	14,795	20,498	18,175	231,301
Federal	3,171	9,155	6,591	10,180	16,437	31,437	39,273	37,221	9,144	5,845	6,486	11,800	186,740
Pine Flat 3/	257	233	184	0	0	0	0	0	0	0	189	247	1,110
Las Perillas	99	143	255	436	755	1,259	1,494	1,269	540	523	459	265	7,497
Badger Hill	199	321	633	1,165	2,058	3,425	4,168	3,540	1,409	1,372	1,166	641	20,097
Buena Vista	4,669	6,226	19,938	14,484	14,329	22,562	28,959	29,901	18,938	3,748	6,819	7,294	177,867
Teerink	5,266	6,786	22,203	14,720	13,483	19,344	24,787	25,440	18,596	2,977	6,750	7,157	167,509
Chrisman	11,577	15,179	50,107	32,217	28,490	41,069	52,726	55,521	41,175	5,456	14,450	16,040	364,007
Edmonston	40,128	52,584	180,187	115,288	98,841	142,692	183,135	194,867	143,799	15,429	47,436	56,162	1,270,548
Oso	2,363	3,431	19,752	3,258	1,807	4,276	4,581	4,181	4,978	1,434	3,428	1,369	54,858
Mojave	0	0	0	0	0	0	0	56	92	81	73	82	384
Pearblossom	6,382	6,770	5,187	24,983	21,173	26,515	36,160	40,880	25,513	457	4,229	12,225	210,474
Warne 3/	148	80	1	107	118	120	143	137	150	164	109	130	1,407
Sales	167,119	492,781	456,304	532,372	572,456	438,811	360,495	361,886	450,325	513,658	425,596	551,141	5,322,944
Other Project													
Loads 4/	32,603	29,244	38,958	29,191	33,709	37,748	43,585	50,296	41,503	62,825	37,400	38,132	475,194
Actual Deviation	832	281	1,896	0	-143	-278	493	826	951	639	788	0	6,285
Losses	14,366	15,940	14,739	20,578	24,006	23,784	21,295	22,744	21,612	20,897	20,059	15,959	235,979

1/ Pumpback and Station Service.

2/ Includes Barker Slough, Cordelia, and Cordelia Interim pumping plants.

3/ Station Service only.

4/ Includes Southern California Edison; Nevada Power Authority; Pacific Gas and Electric; and South Bay Station Service.

Total State: 9,569,191

Total Federal: 469,274

Total Project: 10,038,465

**Table 5. Net Delta Outflow Index
1995**

(in cfs-days except as noted)

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7,248	73,100	30,440	115,001	81,651	66,648	36,054	14,319	18,145	22,554	5,737	9,689
2	6,463	66,855	30,315	108,171	102,444	63,558	36,075	12,705	17,019	23,441	4,877	9,839
3	5,833	67,959	30,227	98,409	141,474	61,126	34,621	15,761	15,895	24,550	4,009	10,457
4	6,061	73,452	31,591	96,217	173,984	60,372	34,685	16,994	16,175	23,340	4,496	10,176
5	7,591	158,274	45,303	91,187	176,383	61,123	32,787	15,404	17,025	22,917	3,996	9,768
6	12,535	71,256	51,107	87,251	170,941	61,161	32,200	14,849	18,195	21,635	4,217	9,285
7	20,232	72,316	49,452	88,282	165,517	60,265	32,017	13,662	17,680	20,616	9,212	9,620
8	23,997	71,302	45,805	87,225	147,950	57,594	29,423	12,562	18,242	18,290	11,760	10,187
9	24,895	71,903	47,744	88,713	136,324	55,708	28,173	11,951	17,959	16,515	11,041	9,708
10	36,143	70,837	51,976	91,723	124,957	53,141	28,074	14,198	19,881	15,081	10,946	9,819
11	58,852	69,954	148,761	101,101	113,751	56,553	29,387	11,175	21,049	13,812	11,359	15,313
12	80,936	68,524	314,655	107,276	107,571	53,279	31,143	12,649	22,671	13,512	10,516	27,230
13	89,181	66,646	353,194	108,271	104,226	50,700	33,238	10,917	22,665	13,345	10,969	34,916
14	84,688	67,216	347,444	106,208	99,835	44,104	32,770	11,959	23,800	12,717	10,726	51,392
15	78,762	70,464	330,869	108,293	100,119	42,206	32,517	12,032	24,222	10,936	10,446	65,821
16	75,375	64,057	294,389	107,936	97,427	45,532	32,022	11,762	24,258	10,603	10,610	64,923
17	73,747	60,900	263,732	106,382	93,006	48,190	29,519	11,845	23,056	12,847	10,879	53,611
18	71,941	59,375	255,465	104,659	86,298	50,092	36,016	15,192	23,825	12,344	10,788	54,358
19	70,194	57,385	244,137	100,762	78,630	55,666	52,408	10,640	25,088	10,725	10,297	49,226
20	67,628	54,038	235,394	96,376	73,281	52,042	46,920	12,044	25,710	11,364	10,440	45,347
21	65,376	45,543	243,061	89,963	69,730	48,920	39,803	16,705	24,637	10,702	10,415	40,779
22	63,265	42,610	246,844	86,722	69,469	48,253	35,145	15,280	24,263	10,197	10,780	36,597
23	63,247	42,477	249,218	81,950	67,653	46,723	30,602	14,463	25,767	10,011	10,860	32,868
24	63,641	39,403	252,825	78,498	67,711	44,728	26,706	12,601	24,017	8,740	10,772	28,661
25	64,145	35,063	255,782	72,952	65,087	38,606	25,457	12,557	24,755	6,219	10,536	26,006
26	105,321	35,004	216,914	67,774	64,418	37,424	22,521	11,891	24,137	4,534	9,259	24,112
27	70,116	30,433	196,439	62,862	64,142	35,583	20,222	11,851	23,339	3,854	10,238	22,706
28	139,813	30,900	167,976	60,574	66,439	37,232	19,201	12,948	22,875	3,963	9,949	20,655
29	89,504		147,698	57,815	66,930	37,402	17,471	13,629	23,902	3,168	9,882	19,872
30	82,981		133,000	63,724	67,477	37,856	14,105	14,602	23,846	4,561	9,629	23,746
31	74,642		124,364		67,910		15,468	16,968		4,165		22,924
Total	1,784,353	1,737,246	5,436,121	2,722,277	3,112,735	1,511,787	946,750	416,115	654,098	401,258	279,641	859,611
Ave.	57,560	62,045	175,359	90,743	100,411	50,393	30,540	13,423	21,803	12,944	9,321	27,729
Max.	139,813	158,274	353,194	115,001	176,383	66,648	52,408	16,994	25,767	24,550	11,760	65,821
Min.	5,833	30,433	30,227	57,815	64,142	35,583	14,105	10,640	15,895	3,168	3,996	9,285
Total In AF	3,539,264	3,445,827	10,782,546	5,399,636	6,174,110	2,998,630	1,877,879	825,364	1,297,403	795,895	554,668	1,705,038

Annual Total = 19,861,992 cfs days
or 39,396,261 acre-feet

**Table 6. Sacramento Basin And Sacramento-San Joaquin Delta Operations
1995**

(in thousands of acre-feet except as noted)

Month	Upstream Reservoir Releases to River			Sacramento River Accretions or Depletions	Delta Inflow			Delta Uses			Delta Exports		
	Keswick 1/	Oroville 1/	Nimbus 1/		Sacramento River at Sacramento 3/	San Joaquin River at Vernalis	Total 4/	Consumptive	Outflow Index		Total	DWR	USBR 5/
									Total	Average 1,000 cfs			
Jan	897	288	526	4,484	3,832	267	4,099	-56	3,539	58	718	458	260
Feb	998	627	310	2,390	3,235	381	3,616	-37	3,446	62	496	257	239
Mar	2,204	1,956	1,097	4,481	4,420	865	5,285	-10	10,783	175	181	31	150
Apr	1,056	850	465	1,564	3,645	1,192	4,837	63	5,391	91	212	8	204
May	1,083	1,179	875	1,525	3,916	1,353	5,269	121	6,174	100	268	77	191
Jun	783	608	435	602	2,406	868	3,274	191	2,999	50	450	199	251
Jul	899	262	670	65	1,872	639	2,511	268	1,878	31	648	336	312
Aug	876	298	177	-153	1,198	280	1,478	252	825	13	572	290	282
Sep	656	396	221	145	1,438	302	1,740	174	1,297	22	441	169	272
Oct	335	208	176	164	909	355	1,264	118	796	13	457	181	276
Nov	298	143	149	203	782	162	944	55	555	9	338	79	259
Dec	300	322	154	791	1,573	155	1,728	2	1,705	28	272	3	269
Total	10,385	7,137	5,255	16,261	29,226	6,819	36,045	1,141	39,388	---	5,053	2,088	2,965

1/ Time lagged values (Keswick: 5 days; Oroville: 3 days; Folsom: 1 day).

2/ Positive values are accretions; negative values are depletions.

3/ These values are based on a measured daily average taken from the Sacramento River at Freeport.

4/ Includes Sacramento County Regional Waste Water Treatment Plant.

5/ Includes USBR water pumped at Banks Pumping Plant, if any.

Table 7. Upper Feather Area Lakes Monthly Operation

1995

(in acre-feet except as noted)

Month	Lake Storage			Outflow							Inflow
	Water Surface Elevation (in feet)	Storage	Storage Change	Regulated Release				Spill	Estimated Evaporation and Seepage	Total Outflow	Computed or Estimated
				Stream-Flow Maint.	Water Supply Contract	Prior Water Rights	Total Regulated Release				

Antelope Lake Capacity 22,566 acre-feet

Jan	4995.25	16,779	2,328	623	0	0	623	0	52	675	3,003
Feb	4999.00	19,868	3,089	1,111	0	0	1,111	0	66	1,177	4,266
Mar	5002.35	22,890	3,022	6,000	0	0	6,000	6,099	112	12,211	15,233
Apr	5004.79	25,242	2,352	5,308	0	0	5,308	10,056	190	15,554	17,906
May	5003.83	24,301	-941	1,230	0	0	1,230	33,702	311	35,243	34,302
Jun	5002.76	23,276	-1,025	1,190	0	0	1,190	14,061	478	15,729	14,704
Jul	5002.17	22,722	-554	1,230	0	0	1,230	2,394	591	4,215	3,661
Aug	5001.36	21,975	-747	1,230	0	0	1,230	68	610	1,908	1,161
Sep	5000.30	21,019	-956	1,069	0	0	1,069	0	424	1,493	537
Oct	4999.00	19,868	-1,151	1,230	0	0	1,230	0	351	1,581	430
Nov	4998.09	19,090	-778	1,190	0	0	1,190	0	222	1,412	634
Dec	4998.94	19,816	726	1,252	0	0	1,252	0	94	1,346	2,072
Total	---	---	5,365	22,663	0	0	22,663	66,380	3,501	92,544	97,909

Frenchman Lake Capacity 55,477 acre-feet

Jan	5563.84	25,013	3,098	123	0	0	123	0	65	188	3,286
Feb	5569.76	31,106	6,093	111	0	0	111	0	73	184	6,277
Mar	5584.87	50,670	19,564	123	0	0	123	0	158	281	19,845
Apr	5589.68	58,172	7,502	94	0	0	94	6,774	317	7,185	14,687
May	5589.30	57,555	-617	0	0	0	0	20,507	537	21,044	20,427
Jun	5588.51	56,286	-1,269	0	0	0	0	7,289	802	8,091	6,822
Jul	5587.46	54,627	-1,659	0	1,134	0	1,134	1,051	997	3,182	1,523
Aug	5583.90	49,236	-5,391	0	4,865	0	4,865	0	984	5,849	458
Sep	5581.86	46,299	-2,937	0	2,344	0	2,344	0	721	3,065	128
Oct	5581.17	45,331	-968	92	576	0	668	0	561	1,229	261
Nov	5581.05	45,163	-168	224	0	0	224	0	362	586	418
Dec	5581.71	46,088	925	123	0	0	123	0	154	277	1,202
Total	---	---	24,173	890	8,919	0	9,809	35,621	5,731	51,162	75,335

Lake Davis Capacity 84,371 acre-feet

Jan	5767.51	57,101	6,008	615	5	0	620	0	220	840	6,848
Feb	5768.99	62,027	4,926	555	2	0	557	0	233	790	5,716
Mar	5772.65	75,198	13,171	8,380	2	0	8,382	0	432	8,814	21,985
Apr	5773.15	77,103	1,905	13,397	1	0	13,398	0	756	14,154	16,059
May	5774.99	84,331	7,228	14,442	7	0	14,449	236	1,294	15,979	23,207
Jun	5774.91	84,009	-322	4,645	37	0	4,682	0	1,945	6,627	6,305
Jul	5774.33	81,700	-2,309	1,111	74	119	1,304	0	2,107	3,411	1,102
Aug	5773.38	77,988	-3,712	895	87	335	1,317	0	2,575	3,892	180
Sep	5772.59	74,971	-3,017	1,105	62	24	1,191	0	1,975	3,166	149
Oct	5771.90	72,387	-2,584	1,221	21	9	1,251	0	1,495	2,746	162
Nov	5771.46	70,764	-1,623	1,190	9	0	1,199	0	588	1,787	164
Dec	5771.86	72,238	1,474	1,230	1	0	1,231	0	405	1,636	3,110
Total	---	---	21,145	48,785	308	487	49,580	236	14,025	63,841	84,986

**Table 8. Lake Oroville Monthly Operation
1995**

(in acre-feet except as noted)

Capacity 3,537,577 acre-feet

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Outflow						Inflow	
				Hyatt Generation 1/	Palermo Canal	Spillway Leakage	Evap- oration	Spill	Total Outflow	Hyatt Pumpback	Computed Inflow 2/
Jan	842.44	2,708,222	1,039,978	328,004	13	137	498	0	328,652	46,182	1,322,448
Feb	837.26	2,641,052	-67,170	644,359	90	228	935	0	645,612	1,602	576,840
Mar	847.42	2,773,891	132,839	720,429	34	315	1,673	1,234,672	1,957,123	10,079	2,079,883
Apr	875.08	3,159,172	385,281	735,187	152	1,458	2,731	154,273	893,801	3,385	1,275,697
May	894.60	3,452,965	293,793	756,564	197	2,054	3,991	518,938	1,281,744	625	1,574,912
Jun	898.43	3,512,826	59,861	739,844	866	3,499	7,643	0	751,852	0	811,713
Jul	892.99	3,428,021	-84,805	411,613	1,030	3,700	10,706	0	427,049	1,796	340,448
Aug	876.63	3,181,820	-246,201	463,234	1,050	3,091	10,396	0	477,771	5,749	225,821
Sep	856.55	2,897,173	-284,647	459,335	1,030	2,174	7,159	0	469,698	317	184,734
Oct	849.42	2,800,576	-96,597	247,421	839	1,548	6,581	0	256,389	0	159,792
Nov	847.56	2,775,753	-24,823	209,466	508	1,379	2,559	0	213,908	29,109	159,976
Dec	841.97	2,702,081	-73,672	382,502	301	1,306	823	0	384,932	6,469	304,791
Total	- - -	- - -	1,033,837	6,097,958	6,110	20,889	55,695	1,907,883	8,088,531	105,313	9,017,055

1/ Includes bypass flows, if any.

2/ Does not include pumpback.

**Table 9. Thermalito Forebay Monthly Operation
1995**

Including Diversion Pool and Power Canal
(end of month storage in acre-feet)

Month	Storage 1/	Storage Change	Inflow			Outflow					Losses (-) and Gains (+)
			Lake Oroville Releases 2/	Kelly Ridge Generation	Thermalito Pumpback	Thermalito Generation 3/	Butte County	Thermalito Irrigation District	Releases to River 4/	Hyatt Pumpback	
Jan	23,169	-139	328,141	15,363	40,265	318,985	27	65	40,436	46,182	21,787
Feb	23,966	797	644,587	13,988	780	635,281	2	44	34,675	1,602	13,046
Mar	23,289	-677	1,955,416	14,840	16,309	835,477	3	39	1,160,225	10,079	18,581
Apr	22,458	-831	890,918	14,993	4,269	752,561	1	33	148,172	3,385	-6,859
May	23,352	894	1,277,556	15,400	1,121	805,868	9	151	486,724	625	194
Jun	23,307	-45	743,343	14,995	0	727,853	40	290	38,823	0	8,623
Jul	24,173	866	415,313	15,300	3,306	393,071	0	395	38,157	1,796	367
Aug	23,828	-345	466,325	15,360	8,392	451,224	0	405	38,000	5,749	4,956
Sep	24,112	284	461,509	7,530	0	432,665	0	324	38,079	317	2,630
Oct	22,497	-1,615	248,969	13,480	0	168,841	0	286	97,010	0	2,073
Nov	24,073	1,576	210,845	14,500	44,686	149,103	1	183	94,510	29,109	4,452
Dec	24,031	-42	383,808	11,690	8,046	312,073	120	106	97,436	6,469	12,618
Total	- - -	723	8,026,730	167,439	127,174	5,983,002	203	2,321	2,312,247	105,313	82,467

1/ Sum of Thermalito Forebay and Diversion Pool.

2/ Sum of releases from Lake Oroville through Hyatt plant, spill, and spillway leakage.

3/ Includes bypass flows, if any.

4/ Sum of Diversion Dam generation plus hatchery.

**Table 10. Thermalito Afterbay Monthly Operation
1995**

(end of month storage in acre-feet)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow	Outflow						Losses (-) and Gains (+)	Total Releases to River 2/
				Thermalito Generation 1/	Sutter Butte Canal	Western Canal Lateral	Richvale Canal	Western Canal	River Outlet	Thermalito Pumpback		
Jan	132.17	39,741	2,814	318,985	5,000	7	2,090	234	251,266	40,265	-17,309	291,702
Feb	132.42	40,664	923	635,281	0	0	0	0	596,800	780	-36,778	631,475
Mar	131.47	37,211	-3,453	835,477	0	0	0	0	796,700	16,309	-25,922	1,956,925
Apr	134.99	50,698	13,487	752,561	3,170	75	1,140	996	708,520	4,269	-20,904	856,692
May	131.06	35,765	-14,933	805,868	69,890	561	12,930	16,680	699,400	1,121	-20,219	1,186,124
Jun	133.66	45,384	9,619	727,853	79,000	580	16,710	29,810	572,600	0	-19,534	611,423
Jul	130.04	32,285	-13,099	393,071	95,640	928	21,950	50,970	224,000	3,306	-9,376	262,157
Aug	133.74	45,697	13,412	451,224	87,290	858	21,990	46,930	260,600	8,392	-11,752	298,600
Sep	128.50	27,349	-18,348	432,665	53,140	133	9,160	18,130	361,100	0	-9,350	399,179
Oct	130.90	35,208	7,859	168,841	24,280	0	6,150	20,290	110,200	0	-62	207,210
Nov	127.00	22,918	-12,290	149,103	31,340	392	13,900	23,310	47,130	44,686	-635	141,640
Dec	133.30	43,989	21,071	312,073	25,320	71	10,920	9,880	224,400	8,046	-12,365	321,836
Total	- - -	- - -	7,062	5,983,002	474,070	3,605	116,940	217,230	4,852,716	127,174	-184,206	7,164,963

1/ Includes bypass flows.

2/ The sum of the flows from the fish barrier dam, fish hatchery, and afterbay river outlet.

Table 11. Lake Del Valle Monthly Operation

1995

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow		Outflow					Precipitation (inches)
				Natural	South Bay Aqueduct	South Bay Aqueduct	Recreation 1/	Arroyo Valle	Evaporation Losses	Total	
Jan	701.09	38,578	12,841	21,419	0	3,741	2	4,806	29	8,578	7.62
Feb	698.78	36,998	-1,580	2,036	0	1,693	2	1,858	63	3,616	0.51
Mar	702.18	39,337	2,339	30,182	0	907	2	26,845	89	27,843	7.56
Apr	703.65	40,376	1,039	3,035	0	0	6	1,809	181	1,996	1.38
May	702.85	39,808	-568	1,713	0	352	12	1,713	204	2,281	1.73
Jun	702.73	39,724	-84	546	0	0	18	280	332	630	1.06
Jul	702.20	39,351	-373	74	0	0	17	0	430	447	0.00
Aug	701.30	38,723	-628	-136	0	0	27	0	465	492	0.00
Sep	695.26	34,670	-4,053	156	0	3,681	23	156	349	4,209	0.00
Oct	687.39	29,834	-4,836	72	0	4,548	13	72	275	4,908	0.00
Nov	683.78	27,792	-2,042	5	0	1,910	15	5	117	2,047	0.01
Dec	680.82	26,207	-1,585	1,038	0	1,544	9	1,038	32	2,623	4.50
Total	---	---	470	60,140	0	18,376	146	38,582	2,566	59,670	24.37

1/ To East Bay Regional Park District.

Table 12. Clifton Court Forebay Monthly Operation**1995**

(elevation in feet, storage in acre-feet)

Month	Water Surface Elevation	End-of-Month Storage	Storage Change	Inflow
Jan	1.88	22,319	3,194	461,614
Feb	0.38	19,082	3,237	253,939
Mar	1.85	22,254	-3,172	32,754
Apr	1.57	21,649	605	8,719
May	0.61	19,577	2,072	78,622
Jun	1.09	20,613	-1,036	203,979
Jul	0.34	18,996	1,617	367,538
Aug	1.30	21,066	-2,070	296,391
Sep	0.77	19,922	1,144	171,787
Oct	0.11	18,500	1,422	181,199
Nov	-1.00	16,112	2,388	73,501
Dec	1.47	21,433	-5,321	6,960
Total	- - -	- - -	4,080	2,137,003

Table 13. San Luis Reservoir Monthly Operation

1995

(in acre-feet except as noted)

Month	Reservoir Storage			Inflow	Outflow				Gain (+) Loss (-)	Evaporation	Precipitation (in inches)
	Water Surface Elevation (in feet)	Storage	Storage Change	Gianelli P-G Plant Pumping	Gianelli P-G Plant Generation	Pacheco Tunnel	Spill	Parks & Recreation Delivery			
Jan	523.85	1,789,637	593,062	599,429	0	8,756	0	0	2,389	1,000	5.74
Feb	542.70	2,024,025	234,388	244,103	0	7,866	0	0	-1,849	1,152	0.34
Mar	543.52	2,034,447	10,422	11,051	7,468	9,575	927	0	17,341	3,180	5.07
Apr	542.92	2,026,819	-7,628	7,546	2,624	9,375	0	0	-3,175	5,992	0.58
May	541.55	2,009,440	-17,379	15,406	23,732	3,987	0	0	-5,066	8,533	0.26
Jun	530.95	1,876,744	-132,696	23,888	137,306	10,162	0	0	-9,116	11,024	0.05
Jul	521.73	1,763,906	-112,838	49,428	141,235	17,456	0	0	-3,575	12,127	0.01
Aug	499.27	1,499,314	-264,592	45,671	288,939	20,284	0	0	-1,040	13,018	0.00
Sep	501.44	1,524,232	24,918	71,109	24,135	14,867	0	0	-7,189	9,140	0.00
Oct	511.18	1,637,786	113,554	137,499	6,594	8,807	0	0	-8,544	6,318	0.00
Nov	513.46	1,664,769	26,983	145,750	101,582	14,842	0	0	-2,343	3,221	0.00
Dec	511.95	1,646,882	-17,887	113,262	120,462	11,047	0	13	373	1,281	2.17
Total	---	---	450,307	1,464,142	854,077	137,024	927	13	-21,794	75,986	14.22

Table 14. O'Neill Forebay Monthly Operation

1995

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow				Outflow				Gain (+) Loss (-)
				Pump In 1/	O'Neill P-G Plant Pumping	Gianelli P-G Plant Generation	California Aqueduct Check 12	O'Neill P-G Plant Generation	Gianelli P-G Plant Pumping	Dos Amigos Pumping	Deliveries	
Jan	222.32	49,235	3,081	99	243,148	0	446,427	0	599,429	85,609	289	-1,266
Feb	219.34	41,451	-7,784	90	177,133	0	252,021	0	244,103	198,682	802	6,559
Mar	221.19	46,259	4,808	931	118,321	7,468	28,304	63	11,051	141,969	683	3,550
Apr	220.35	44,062	-2,197	0	168,715	2,624	3,005	0	7,546	177,243	1,218	9,466
May	219.62	42,170	-1,892	0	140,114	23,732	66,104	0	15,406	227,664	1,739	12,967
Jun	221.55	47,204	5,034	0	140,827	137,306	182,851	0	23,888	436,191	2,892	7,021
Jul	223.08	51,260	4,056	0	145,966	141,235	341,091	0	49,428	572,439	3,933	1,564
Aug	223.01	51,073	-187	0	36,692	288,939	268,650	546	45,671	543,379	4,389	-483
Sep	221.10	46,023	-5,050	0	109,443	24,135	155,276	0	71,109	216,624	1,511	-4,660
Oct	222.06	48,544	2,521	0	119,590	6,594	163,377	0	137,499	152,619	942	4,020
Nov	222.25	49,049	505	0	175,247	101,582	72,451	0	145,750	198,839	331	-3,855
Dec	221.18	46,233	-2,816	0	218,375	120,462	0	0	113,262	221,377	367	-6,647
Total	---	---	79	1,120	1,793,571	854,077	1,979,557	609	1,464,142	3,172,635	19,096	28,236

1/ Pump-in located at Mile 79.67R. Includes 927 AF of Sisk Dam spill from March 10 through March 25.

**Table 15. Monthly Operations Summary, State-Federal San Luis Joint-Use Facilities
1995**

(In acre-feet except as noted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Check 12													
State	446,427	252,021	28,304	3,005	66,104	182,851	312,674	268,650	155,276	163,377	72,451	0	1,951,140
Federal	0	0	0	0	0	0	28,417	0	0	0	0	0	28,417
Total	446,427	252,021	28,304	3,005	66,104	182,851	341,091	268,650	155,276	163,377	72,451	0	1,979,557
O'Neill P-G Plant													
Pumping													
State	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal	243,148	177,133	118,321	168,715	140,114	140,827	145,966	36,692	109,443	119,590	175,247	218,375	1,793,571
Total	243,148	177,133	118,321	168,715	140,114	140,827	145,966	36,692	109,443	119,590	175,247	218,375	1,793,571
Generation													
Federal	0	0	63	0	0	0	0	546	0	0	0	0	609
O'Neill Forebay													
End-of-Month Storage													
State *	-45,080	-58,451	-86,190	-107,089	-140,262	-175,439	-191,793	-243,601	-264,756	-261,728	-261,709	-281,781	---
Federal	94,315	99,902	132,449	151,151	182,432	222,643	243,053	294,674	310,779	310,272	310,758	328,014	---
Total	49,235	41,451	46,259	44,062	42,170	47,204	51,260	51,073	46,023	48,544	49,049	46,233	---
San Luis Reservoir													
End-of-Month Storage													
State	1,091,587	1,171,880	1,169,817	1,086,588	1,061,812	1,048,887	1,073,430	1,077,656	1,081,845	1,133,031	1,048,190	911,417	---
Federal	698,050	852,145	864,630	940,231	947,628	827,857	690,476	421,658	442,387	504,755	616,579	735,465	---
Total	1,789,637	2,024,025	2,034,447	2,026,819	2,009,440	1,876,744	1,763,906	1,499,314	1,524,232	1,637,786	1,664,769	1,646,882	---
Gianelli P-G Plant													
Pumping													
State	381,272	81,310	-123	-83	-77	23,226	49,428	45,671	22,190	62,479	52,030	997	718,320
Federal	218,157	162,793	11,174	7,629	15,483	662	0	0	48,919	75,020	93,720	112,265	745,822
Total	599,429	244,103	11,051	7,546	15,406	23,888	49,428	45,671	71,109	137,499	145,750	113,262	1,464,142
Generation													
State	0	0	7,468	-100	12,413	31,137	37,919	40,873	14,047	6,594	101,582	120,462	372,395
Federal	0	0	0	2,724	11,319	106,169	103,316	248,066	10,088	0	0	0	481,682
Total	0	0	7,468	2,624	23,732	137,306	141,235	288,939	24,135	6,594	101,582	120,462	854,077
Pacheco Tunnel Diversion													
Federal	8,756	7,866	9,575	9,375	3,987	10,162	17,456	20,284	14,867	8,807	14,842	11,047	137,024
Dos Amigos P.P.													
Pumping													
State	81,774	134,889	122,396	110,594	128,398	229,767	303,328	315,321	165,650	106,578	153,788	134,351	1,986,834
Federal	3,835	63,793	19,573	66,649	99,266	206,424	269,111	228,058	50,974	46,041	45,051	87,026	1,185,801
Total	85,609	198,682	141,969	177,243	227,664	436,191	572,439	543,379	216,624	152,619	198,839	221,377	3,172,635

* Negative storage values indicate a deficit in storage withdrawals versus amounts stored and positive values larger than the reservoir capacity indicate a surplus of amounts stored versus storage withdrawals.

**Table 16. Pyramid Lake Monthly Operation
1995**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Natural Inflow Storage Shares	Storage Change	Inflow			Outflow			Computed Losses (-) Gains (+)
					Project		Natural	Project		Natural	
					Castaic Powerplant Pumpback 1/	Warne Powerplant		Castaic Powerplant Generation	Deliveries	Stream Flow Release 2/	
Jan	2,570.95	160,959	10,830	1,454	0	5,532	35,902	17,500	1	25,958	3,479
Feb	2,573.42	164,056	24,333	3,097	11	10,197	13,787	20,414	1	284	-199
Mar	2,575.83	167,115	53,108	3,059	51	74,102	29,087	103,713	0	312	3,844
Apr	2,570.25	160,088	63,077	-7,027	6,322	10,982	10,505	33,927	2	536	-371
May	2,571.19	161,258	3/ 6,418	1,170	15,247	5,857	6,551	24,345	2	1,523	-615
Jun	2,569.70	159,406	8,143	-1,852	64,559	14,667	3,200	81,274	0	1,474	-1,530
Jul	2,570.17	159,989	8,061	583	53,906	15,641	1,456	69,308	5	1,538	431
Aug	2,572.37	162,734	7,462	2,745	71,751	15,128	933	82,233	2	1,532	-1,300
Sep	2,576.37	167,805	6,761	5,071	35,462	17,248	778	47,000	3	1,479	65
Oct	2,573.97	164,750	6,148	-3,055	0	4,389	927	6,208	2	1,540	-621
Nov	2,573.44	164,081	5,553	-669	14,564	11,837	1,050	26,555	1	1,645	81
Dec	2,571.52	161,670	-2,896	-2,411	44,005	3,481	1,278	48,516	0	3,935	1,276
Total	---	---	---	2,165	305,878	189,061	105,454	560,993	19	41,756	4,540

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) from Elderberry Forebay through Castaic powerplant.

2/ Portions of these amounts are used to satisfy fishery enhancement agreement.

3/ There were 61,687 AF returned to storage in Pyramid Lake on May 1, 1995.

**Table 17. Elderberry Forebay Monthly Operation
1995**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage	Storage Change	Inflow		Outflow			Computed Losses (-) Gains (+)
				Castaic Powerplant Generation	Natural	Castaic Powerplant Pumpback 1/	To Castaic Lake		
							Natural	Project	
Jan	1481.46	10,149	5,072	17,500	11,737	0	11,737	10,099	-2,329
Feb	1499.14	15,231	5,082	20,414	4,741	11	4,741	13,353	-1,968
Mar	1511.97	19,949	4,718	103,713	8,708	51	8,708	102,110	3,166
Apr	1528.43	26,960	7,011	33,927	3,397	6,322	3,397	19,610	-984
May	1527.96	26,744	-216	24,345	1,747	15,247	1,747	7,927	-1,387
Jun	1528.34	26,919	175	81,274	680	64,559	680	16,540	0
Jul	1522.68	24,396	-2,523	69,308	165	53,906	165	16,347	-1,578
Aug	1519.07	22,846	-1,550	82,233	20	71,751	20	11,925	-107
Sep	1506.66	17,922	-4,924	47,000	1	35,462	1	15,372	-1,090
Oct	1515.93	21,538	3,616	6,208	17	0	17	1,991	-601
Nov	1517.87	22,341	803	26,555	42	14,564	42	10,214	-974
Dec	1512.51	20,163	-2,178	48,516	97	44,005	97	5,024	-1,665
Total	- - -	- - -	15,086	560,993	31,352	305,878	31,352	230,512	-9,517

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) through Castaic Powerplant.

**Table 18. Castaic Lake Monthly Operation
1995**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage	Natural Inflow Storage Shares 1/	Storage Change	Inflow			Outflow		Computed Losses (-) Gains (+)
					From Elderberry Forebay		Natural	Project Deliveries	Released to Castaic Lagoon	
					Natural	Project				
Jan	1,434.09	170,383	21,595	23,256	11,737	10,099	9,603	15,606	0	7,423
Feb	1,446.06	189,781	27,101	19,398	4,741	13,353	5,514	2,836	8	-1,366
Mar	1,504.31	300,321	45,883	110,540	8,708	102,110	10,076	1,322	2	-9,030
Apr	1,509.73	312,045	53,078	11,724	3,397	19,610	3,955	12,137	157	-2,944
May	1,510.13	312,921	4,589	876	1,747	7,927	2,282	10,482	0	-598
Jun	1,511.09	315,029	4,075	2,108	680	16,540	996	13,318	2,190	-600
Jul	1,509.90	310,647	1,928	-4,382	165	16,347	263	17,731	2,575	-851
Aug	1,504.49	300,706	208	-9,941	20	11,925	99	19,391	1,839	-755
Sep	1,502.86	297,229	157	-3,477	1	15,372	64	17,702	116	-1,096
Oct	1,494.68	280,139	266	-17,090	17	1,991	92	18,764	0	-426
Nov	1,492.79	276,275	461	-3,864	42	10,214	153	13,732	0	-541
Dec	1,487.10	264,823	407	-11,452	97	5,024	269	16,323	420	-99
Total	- - -	- - -	- - -	117,696	31,352	230,512	33,366	159,344	7,307	-10,883

1/ 52,518 appropriated as of 5/1/95. 560 AF unable to deliver before 5/1/95 due to operational maintenance problems. Delivered 560 AF in June 95.

**Table 19. Castaic Lagoon Monthly Operation
1995**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow	Natural Outflow		Deliveries to Recreation	Computed Losses (-) Gains (+)
					Release From Castaic Afterbay			
					Surface	Sub-Surface		
Jan	1136.00	5,662	551	0	0	155	66	772
Feb	1135.56	5,576	-86	8	0	57	37	0
Mar	1135.80	5,617	41	2	0	62	24	125
Apr	1135.75	5,613	-4	157	0	92	69	0
May	1134.81	5,430	-183	0	0	105	78	0
Jun	1136.46	5,752	322	2,190	1,668	90	110	0
Jul	1137.69	5,997	245	2,575	2,104	93	133	0
Aug	1135.61	5,585	-412	1,839	1,839	277	135	0
Sep	1135.58	5,580	-5	116	0	0	121	0
Oct	1134.64	5,399	-181	0	0	74	107	0
Nov	1133.74	5,223	-176	0	0	113	63	0
Dec	1134.94	5,455	232	420	0	144	44	0
Total	---	---	344	7,307	5,611	1,262	987	897

Table 20. Silverwood Lake Monthly Operation

1995

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Natural Inflow Storage Shares	Storage Change	Inflow		Outflow				Computed Losses (-) Gains (+)	Total Natural Inflow Released 1/	Appropriated Water From Houston Crk. To CLAWA
					Project	Natural	San Bernardino Tunnel	Project Deliveries		Natural Inflow to Mojave River			
								Recreation	CLAWA				
Jan	3,352.04	72,111	1,335	2,179	7,246	12,135	10,549	2	80	9,010	2,439	9,916	1,285
Feb	3,349.19	69,416	1,351	-2,695	8,517	7,294	12,015	2	37	6,272	-180	7,278	0
Mar	3,346.56	66,978	3,557	-2,438	7,670	13,693	12,971	4	23	10,595	-208	11,487	0
Apr	3,351.12	71,235	1,527	4,257	34,220	3,424	28,716	4	28	4,323	-316	5,454	0
May	3,350.36	70,516	2,035	-719	28,260	2,012	32,166	5	38	314	1,532	1,504	0
Jun	3,349.54	69,744	1,828	-772	37,940	1,016	39,041	6	60	135	-486	1,223	0
Jul	3,349.15	69,379	1,119	-365	52,739	393	52,274	9	97	100	-1,017	1,102	0
Aug	3,348.25	68,539	238	-840	60,880	60	60,258	12	142	12	-1,356	941	0
Sep	3,331.38	53,808	108	-14,731	36,850	56	51,002	9	125	12	-489	108	0
Oct	3,317.76	43,295	199	-10,513	1,390	23	11,655	8	99	10	-154	10	0
Nov	3,311.34	38,757	244	-4,538	4,060	53	8,606	6	68	8	37	8	0
Dec	3,311.66	38,977	249	220	14,890	100	15,682	2	89	7	1,010	95	0
Total	---	---	---	-30,955	294,662	40,259	334,935	69	886	30,798	812	39,126	1,285

1/ Total releases made from Mojave Siphon to Las Flores Ranch Co., in exchange for natural inflow stored in lake, and from Silverwood Lake to Mojave River from outlet for Mojave W.A. The difference between this total column and the natural inflow released to Mojave River equals the Las Flores Ranch exchange.

**Table 21. Lake Perris Monthly Operation
1995**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage	Storage Change	Inflow	Outflow (Deliveries)	Computed Losses (-) Gains (+)
Jan	1581.82	112,979	3,427	2,605	372	1,194
Feb	1583.66	117,042	4,063	4,514	327	-124
Mar	1585.61	121,407	4,365	5,374	384	-625
Apr	1584.19	118,223	-3,184	3,088	5,079	-1,193
May	1585.17	120,417	2,194	5,039	1,843	-1,002
Jun	1585.04	120,125	-292	522	385	-429
Jul	1585.42	120,979	854	3,353	405	-2,094
Aug	1587.52	125,743	4,764	7,434	418	-2,252
Sep	1587.59	125,903	160	966	743	-63
Oct	1585.96	122,197	-3,706	674	3,107	-1,273
Nov	1583.67	117,065	-5,132	534	4,509	-1,157
Dec	1581.32	111,883	-5,182	0	3,885	-1,297
Total	---	---	2,331	34,103	21,457	-10,315

Table 22a. Summary of California Aqueduct

1995

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DELTA FIELD DIVISION													
Note: North Bay Aqueduct, South Bay Aqueduct, and Lake Del Valle are not within the Edmond G. Brown California Aqueduct, they are shown here for completeness.													
North Bay Aqueduct													
Pumped at Barker Slough Pumping Plant	1,739	1,328	929	2,205	1,172	2,326	4,045	3,334	2,972	3,013	2,609	1,763	27,435
Deliveries (Travis & Fairfield/Vacaville)	619	98	459	851	329	321	1,259	559	322	286	198	152	5,453
Pumped at Cordelia Pumping Plant	1,121	1,173	430	1,283	787	1,914	2,614	2,739	2,551	2,597	2,309	1,557	21,075
Deliveries (Benicia, Vallejo, A.C. 1&2, & Napa)	1,121	1,173	430	1,283	787	1,914	2,614	2,739	2,551	2,597	2,309	1,557	21,075
Cordelia Spillway	0	0	0	0	0	0	0	0	0	0	0	0	0
Computed Losses (-), Gains (+)	1	-57	-40	-71	-56	-91	-172	-36	-99	-130	-102	-54	-907
California Aqueduct													
Pumped at Banks Pumping Plant	458,420	257,176	30,927	7,949	77,061	199,115	364,426	289,801	169,088	181,231	79,050	2,635	2,116,879
Pumped at South Bay Pumping Plant	1,493	263	1,584	4,520	5,538	9,570	11,552	11,876	6,769	6,764	4,952	1,427	66,308
Delivered to Contracting Agencies	18	17	16	321	593	914	1,303	911	539	536	158	55	5,381
Inflow Into Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Storage	647	-1,540	282	-937	1,774	187	306	-679	115	-335	2,482	151	2,453
Outflow at Check 12	446,427	252,021	28,304	3,005	66,104	182,851	341,091	268,650	155,276	163,377	72,451	0	1,979,557
Computed Losses (-), Gains (+)	-9,835	-6,415	-741	-1,040	-3,052	-5,593	-10,174	-9,043	-6,389	-10,889	993	-1,002	-63,180
South Bay Aqueduct													
Pumped at South Bay Pumping Plant	1,493	263	1,584	4,520	5,538	9,570	11,552	11,876	6,769	6,764	4,952	1,427	66,308
Inflow from Lake Del Valle	3,741	3,551	3,523	1,809	2,065	280	0	0	3,837	4,620	1,915	2,582	27,923
Outflow (Pumped into Lake Del Valle)	0	0	0	0	0	0	0	0	0	0	0	0	0
Outflow, Deliveries	5,224	3,798	5,011	6,313	7,592	9,840	11,542	11,866	10,596	11,374	6,857	3,999	94,012
Computed Losses (-), Gains (+)	-10	-16	-96	-16	-11	-10	-10	-10	-10	-10	-10	-10	-219
Lake Del Valle Operation:													
Natural inflow	21,419	2,036	30,182	3,035	1,713	546	74	-136	156	72	5	1,038	60,140
Inflow from South Bay Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0
Outflows to Arroyo Valle & S.B. Aqueduct	8,547	3,551	27,752	1,809	2,065	280	0	0	3,837	4,620	1,915	2,582	56,958
Delivered to EBRP District	2	2	2	6	12	18	17	27	23	13	15	9	146
End-of-Month Storage (State)	38,578	36,998	39,337	40,376	39,808	39,724	39,351	38,723	34,670	29,834	27,792	26,207	- - -
Change in Storage	12,841	-1,580	2,339	1,039	-568	-84	-373	-628	-4,053	-4,836	-2,042	-1,585	470
Evaporation Losses	-29	-63	-89	-181	-204	-332	-430	-465	-349	-275	-117	-32	-2,566
SAN LUIS FIELD DIVISION													
O'Neill Forebay Operation													
End-of-Month Storage	49,235	41,451	46,259	44,062	42,170	47,204	51,260	51,073	46,023	48,544	49,049	46,233	- - -
Inflow, California Aqueduct	446,427	252,021	28,304	3,005	66,104	182,851	341,091	268,650	155,276	163,377	72,451	0	1,979,557
Inflow, O'Neill P.- G. Plant	243,148	177,133	118,321	168,715	140,114	140,827	145,966	36,692	109,443	119,590	175,247	218,375	1,793,571
Inflow, Gianelli P.- G. Plant	0	0	7,468	2,624	23,732	137,306	141,235	288,939	24,135	6,594	101,582	120,462	854,077
Pump in / Sisk Dam spill 1/	99	90	931	0	0	0	0	0	0	0	0	0	1,120
Delivered to Dept. of Fish and Game (State)	93	15	38	65	10	32	52	74	75	97	76	25	652
Delivered to Dept. of Fish and Game (Fed.)	76	13	31	54	9	27	42	61	61	80	63	15	532
Delivered to Dept. of Parks & Rec. (Fed.)	0	0	0	0	0	0	0	0	0	0	0	49	49
Delivered to Dept. of Parks & Rec. (State)	0	0	0	0	0	0	0	0	0	0	0	59	59
Delivered to Federal Customers	120	774	614	1,099	1,720	2,833	3,839	4,254	1,375	765	192	219	17,804
Outflow, O'Neill P.- G. Plant	0	0	63	0	0	0	0	546	0	0	0	0	609
Outflow, Gianelli P.- G. Plant	599,429	244,103	11,051	7,546	15,406	23,888	49,428	45,671	71,109	137,499	145,750	113,262	1,464,142
Outflow, Dos Amigos P.P.	85,609	198,682	141,969	177,243	227,664	436,191	572,439	543,379	216,624	152,619	198,839	221,377	3,172,635
Change in Storage	3,081	-7,784	4,808	-2,197	-1,892	5,034	4,056	-187	-5,050	2,521	505	-2,816	79
Computed Losses (-), Gains (+)	-1,266	6,559	3,550	9,466	12,967	7,021	1,564	-483	-4,660	4,020	-3,855	-6,647	28,236
San Luis Reservoir Operation													
State End-of-Month Storage	1,091,587	1,171,880	1,169,817	1,086,588	1,061,812	1,048,887	1,073,430	1,077,656	1,081,845	1,133,031	1,048,190	911,417	- - -
Total End-of-Month Storage	1,789,637	2,024,025	2,034,447	2,026,819	2,009,440	1,876,744	1,763,906	1,499,314	1,524,232	1,637,786	1,664,769	1,646,882	- - -
Inflow, Gianelli P.- G. Plant	599,429	244,103	11,051	7,546	15,406	23,888	49,428	45,671	71,109	137,499	145,750	113,262	1,464,142
Outflow, Gianelli P.- G. Plant	0	0	7,468	2,624	23,732	137,306	141,235	288,939	24,135	6,594	101,582	120,462	854,077
Delivered to Dept of Parks & Rec.	0	0	0	0	0	0	0	0	0	0	0	13	13
Pacheco Tunnel Diversion	8,756	7,866	9,575	9,375	3,987	10,162	17,456	20,284	14,867	8,807	14,842	11,047	137,024
Sisk Dam Spill	0	0	927	0	0	0	0	0	0	0	0	0	927
Change in Storage (Total)	593,062	234,388	10,422	-7,628	-17,379	-132,696	-112,838	-264,592	24,918	113,554	26,983	-17,887	450,307
Computed Losses (-), Gains (+)	2,389	-1,849	17,341	-3,175	-5,066	-9,116	-3,575	-1,040	-7,189	-8,544	-2,343	373	-21,794

1/ Pump-in located at Mile 79.67R. Includes 927 AF of Sisk Dam spill from March 10 through March 25.

Table 22b. Summary of California Aqueduct (cont.)

1995

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SAN LUIS FIELD DIVISION (Cont.)													
California Aqueduct (Pools 14 thru 21)													
Inflow, Dos Amigos P.P.(State)	81,774	134,889	122,396	110,594	128,398	229,767	303,328	315,321	165,650	106,578	153,788	134,351	1,986,834
Inflow, Dos Amigos P.P.(Federal)	3,835	63,793	19,573	66,649	99,266	206,424	269,111	228,058	50,974	46,041	45,051	87,026	1,185,801
Total Inflow, Dos Amigos P.P.	85,609	198,682	141,969	177,243	227,664	436,191	572,439	543,379	216,624	152,619	198,839	221,377	3,172,635
Flow into Aqueduct	8,546	1,295	20,055	232	2,191	908	23	0	0	0	0	0	33,250
Delivered to Dept. of Fish and Game (State)	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Dept. of Fish and Game (Fed.)	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Federal Customers 1/	34,731	58,148	26,306	60,013	94,181	205,032	268,858	230,443	50,799	48,093	44,476	68,455	1,189,535
Outflow, Check 21 (State)	54,440	122,955	133,460	101,045	119,346	225,794	302,028	317,964	165,919	105,556	153,184	150,087	1,951,778
Outflow, Check 21 (Federal)	1,183	497	0	0	200	0	0	0	1,244	3,663	1,629	1,309	9,725
Change in Storage	-2,144	3,372	-2,835	1,314	-12	1,170	963	271	-1,727	-134	-1,728	2,497	1,007
Computed Losses (-), Gains (+)	-5,945	-15,005	-5,093	-15,103	-16,140	-5,103	-613	5,299	-389	4,559	-1,278	971	-53,840
SAN JOAQUIN FIELD DIVISION													
California Aqueduct, Check 21 to Buena Vista Pumping Plant													
Inflow, Check 21 (state)	54,440	122,955	133,460	101,045	119,346	225,794	302,028	317,964	165,919	105,556	153,184	150,087	1,951,778
Inflow, Check 21 (Federal)	1,183	497	0	0	200	0	0	0	1,244	3,663	1,629	1,309	9,725
Total Inflow, Check 21	55,623	123,452	133,460	101,045	119,546	225,794	302,028	317,964	167,163	109,219	154,813	151,396	1,961,503
Kern River Intertie	0	0	11,850	0	0	0	0	0	0	0	0	0	11,850
Delivered to Contracting State Agencies 2/	32,216	92,125	37,660	30,089	44,073	105,206	152,421	168,134	73,506	80,958	115,411	114,774	1,046,573
Delivered to Federal Customers	1,183	497	0	0	200	0	0	0	1,244	3,663	1,629	1,309	9,725
Kern Water Bank Preconsol. Return	479	0	0	0	0	0	0	0	0	0	0	0	479
Outflow, Buena Vista P.P.	18,533	24,885	81,378	59,161	58,773	92,919	117,914	123,254	77,659	14,668	27,409	29,390	725,943
Coastal Br. Diversion	985	1,689	3,466	5,884	10,193	16,992	20,615	17,530	7,426	7,124	6,095	3,523	101,522
Change in Storage	-1,007	844	-194	441	-1,070	704	-312	769	15	51	-305	444	381
Computed Losses (-), Gains (+)	-4,192	-3,412	700	-5,470	-7,377	-9,973	-11,390	-8,277	-7,313	-2,755	-4,574	-1,956	-65,988
California Aqueduct, Buena Vista P.P. to Teerink Pumping Plant													
Inflow, Buena Vista P.P.	18,533	24,885	81,378	59,161	58,773	92,919	117,914	123,254	77,659	14,668	27,409	29,390	725,943
Delivered to Contracting State Agencies	359	1,246	1,560	6,167	9,733	21,590	28,526	29,715	9,664	4,725	2,956	3,672	119,913
W.R.M.W.S.D. Pumpback	0	0	0	0	0	0	0	0	0	0	0	0	0
Outflow, Teerink Pumping Plant	18,108	24,013	81,742	53,487	49,914	73,034	92,771	96,169	70,377	10,439	24,568	26,150	620,772
Change in Storage	75	-183	87	24	-349	182	83	355	14	-296	239	-299	-68
Computed Losses (-), Gains (+)	9	191	2,011	517	525	1,887	3,466	2,985	2,396	200	354	134	14,674
California Aqueduct, Teerink Pumping Plant to Chrisman Pumping Plant													
Inflow, Teerink Pumping Plant	18,108	24,013	81,742	53,487	49,914	73,034	92,771	96,169	70,377	10,439	24,568	26,150	620,772
Delivered to Contracting State Agencies	17	107	233	1,297	3,284	4,495	5,780	4,337	2,640	1,961	1,404	579	26,134
Outflow, Chrisman Pumping Plant	17,476	23,584	81,057	51,955	45,333	66,453	85,997	89,551	66,070	7,739	22,346	24,681	582,242
Change in Storage	0	0	0	77	23	48	-14	-3	3	3	29	-11	155
Computed Losses (-), Gains (+)	-615	-322	-452	-158	-1,274	-2,038	-1,008	-2,284	-1,664	-736	-789	-901	-12,241
California Aqueduct, Chrisman P.P. to Edmonston P.P.													
Inflow, Chrisman Pumping Plant	17,476	23,584	81,057	51,955	45,333	66,453	85,997	89,551	66,070	7,739	22,346	24,681	582,242
Delivered to Contracting State Agencies	408	400	52	554	1,921	2,817	3,639	2,852	1,985	1,502	1,699	401	18,230
Outflow, Edmonston P.P.	17,385	23,134	80,303	51,148	44,009	63,487	81,930	86,614	64,003	6,404	20,748	24,539	563,704
Change in Storage	-89	85	-50	82	-130	32	69	112	24	-91	83	21	148
Computed Losses (-), Gains (+)	228	35	-752	-172	467	-117	-359	27	-58	76	184	280	-160
Coastal Branch, California Aqueduct													
Inflow, Las Perillas P.P.	985	1,689	3,466	5,884	10,193	16,992	20,615	17,530	7,426	7,124	6,095	3,523	101,522
B.M.W.S.D. Pumpback	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Contracting State Agencies	998	1,632	3,243	5,331	9,022	15,923	18,950	16,492	7,205	6,551	5,984	3,205	94,536
Delivered to Federal Customers	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Storage	-4	4	-12	-1	8	-10	20	13	-10	10	-4	-7	7
Computed Losses (-), Gains (+)	9	-53	-235	-554	-1,163	-1,079	-1,645	-1,025	-231	-564	-115	-325	-6,979

1/ Includes 50 ac-ft of phase 1 non-chargeable refill water to WWD.

2/ Includes 42 ac-ft of recreation water delivered to DFG.

Table 22c. Summary of California Aqueduct (cont.)

1995

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SOUTHERN FIELD DIVISION													
Tehachapi Afterbay Operation													
Inflow from Edmonston P.P.	17,385	23,134	80,303	51,148	44,009	63,487	81,930	86,614	64,003	6,404	20,748	24,539	563,704
Outflow to West Branch	7,835	11,800	73,728	10,867	5,936	15,292	16,000	14,688	18,301	4,545	11,933	4,051	194,976
Outflow to East Branch	9,549	11,336	6,597	40,252	38,045	48,172	65,909	71,915	45,704	1,852	8,824	20,486	368,641
Change in Storage	6	-8	5	-2	3	1	-5	-1	-1	6	-16	2	-10
Computed Losses (-), Gains (+)	5	-6	27	-31	-25	-22	-26	-12	1	-1	-7	0	-97
California Aqueduct, Tehachapi Afterbay to Pearblossom P.P.													
Inflow (Aqueduct)	9,549	11,336	6,597	40,252	38,045	48,172	65,909	71,915	45,704	1,852	8,824	20,486	368,641
Inflow (L.A.D.W.P.)	0	0	0	1,479	0	0	0	0	0	0	0	0	1,479
Delivered to Contracting Agencies	1,396	1,680	1,731	3,501	5,300	7,789	9,777	9,874	7,188	3,255	1,784	2,679	55,954
Outflow, Pearblossom P.P.	8,630	9,440	7,016	36,208	30,593	39,054	53,583	61,096	38,132	93	5,652	17,350	306,847
Change in Storage	-76	-233	-178	-266	308	-325	619	91	413	-1,550	895	438	136
Computed Losses (-), Gains (+)	401	-449	1,972	-2,288	-1,844	-1,654	-1,930	-854	29	-54	-493	-19	-7,183
California Aqueduct, Pearblossom P.P. to Silverwood Lake													
Inflow, Pearblossom P.P.	8,630	9,440	7,016	36,208	30,593	39,054	53,583	61,096	38,132	93	5,652	17,350	306,847
Deliveries (Exchange of Natural Inflow)	277	296	400	661	1,248	659	683	661	1,152	8	117	1,333	7,495
Exchange of Natural Inflow (Los Flores T.O.)	906	1,006	892	1,131	1,190	1,088	1,002	929	96	0	0	88	8,328
Outflow to Silverwood Lake	7,246	8,517	7,670	34,220	28,260	37,940	52,739	60,880	36,850	1,390	4,060	14,890	294,662
Change in Storage	-209	156	-1,344	1,221	-240	326	34	-187	270	-729	-119	958	137
Computed Losses (-), Gains (+)	-410	535	602	1,025	-135	959	875	1,187	236	576	-1,594	-81	3,775
Silverwood Lake Operation													
Inflow, Project	7,246	8,517	7,670	34,220	28,260	37,940	52,739	60,880	36,850	1,390	4,060	14,890	294,662
Inflow, Natural	12,135	7,294	13,693	3,424	2,012	1,016	393	60	56	23	53	100	40,259
Delivered to Contracting Agencies	80	37	23	28	38	60	97	142	125	99	66	89	884
Recreation Deliveries	2	2	4	4	5	6	9	12	9	8	6	2	69
Outflow, Natural Inflow Released	9,010	6,272	10,595	4,323	314	135	100	12	12	10	8	7	30,798
Outflow, Project Water at San Bernardino Tunnel	10,549	12,015	12,971	28,716	32,166	39,041	52,274	60,258	51,002	11,655	8,606	15,682	334,935
Change in storage	2,179	-2,695	-2,438	4,257	-719	-772	-365	-840	-14,731	-10,513	-4,538	220	-30,955
Computed Losses (-), Gains (+)	2,439	-180	-208	-316	1,532	-486	-1,017	-1,356	-489	-154	35	1,010	810
California Aqueduct, Silverwood Lake to Lake Perris													
Inflow, San Bernardino Tunnel	10,549	12,015	12,971	28,716	32,166	39,041	52,274	60,258	51,002	11,655	8,606	15,682	334,935
Inflow, SBVMWD Pump-in at DC Afterbay	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Contracting Agencies	7,940	7,500	7,594	25,627	27,126	38,527	48,916	51,868	50,109	10,983	8,673	15,016	299,879
Outflow to Lake Perris	2,605	4,514	5,374	3,088	5,039	522	3,353	7,434	966	674	534	0	34,103
Change in Storage	3	0	2	-1	-1	-11	2	953	-84	-13	-610	656	896
Operational Losses (-), Gains (+)	-1	-1	-1	-2	-2	-3	-3	-3	-11	-11	-9	-10	-57
Lake Perris Operation													
Inflow	2,605	4,514	5,374	3,088	5,039	522	3,353	7,434	966	674	534	0	34,103
Delivered to Contracting Agencies	369	323	379	5,060	1,817	341	342	343	715	3,035	4,497	3,878	21,099
Recreation Deliveries	3	4	5	19	26	44	63	75	28	72	12	7	358
Outflow (Pumpback)	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Storage	3,427	4,063	4,365	-3,184	2,194	-292	854	4,764	160	-3,706	-5,132	-5,182	2,331
Computed Losses (-), Gains (+)	1,194	-124	-625	-1,193	-1,002	-429	-2,094	-2,252	-63	-1,273	-1,157	-1,297	-10,315

1995
(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SOUTHERN FIELD DIVISION (Cont.)													
West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.													
Inflow	7,835	11,800	73,728	10,867	5,936	15,292	16,000	14,688	18,301	4,545	11,933	4,051	194,976
Outflow, Oso Pumping Plant	7,833	11,806	73,796	10,780	5,851	15,218	15,935	14,655	18,305	4,523	11,962	4,043	194,707
Change in Storage	19	-25	13	-8	8	5	-15	-2	-2	19	-50	6	-32
Computed Losses (-), Gains (+)	17	-19	81	-95	-77	-69	-80	-35	2	-3	-21	-2	-301
West Branch California Aqueduct Oso P.P. to Pyramid Lake													
Inflow, Oso P.P.	7,833	11,806	73,796	10,780	5,851	15,218	15,935	14,655	18,305	4,523	11,962	4,043	194,707
Outflow through Warne Pumping Plant to Pyramid Lake	5,532	10,197	74,102	10,982	5,857	14,667	15,641	15,128	17,248	4,389	11,837	3,481	189,061
Change in Storage	2,717	1,476	-270	243	321	562	305	-663	346	684	832	374	6,927
Operational Losses (-), Gains (+)	416	-133	36	445	327	11	11	-190	-711	550	707	-188	1,281
Pyramid Lake Operation													
Inflow, Project	5,532	10,197	74,102	10,982	5,857	14,667	15,641	15,128	17,248	4,389	11,837	3,481	189,061
Inflow, Natural	35,902	13,787	29,087	10,505	6,551	3,200	1,456	933	778	927	1,050	1,278	105,454
Inflow, Pumpback from Elderberry Forebay	0	11	51	6,322	15,247	64,559	53,906	71,751	35,462	0	14,564	44,005	305,878
Deliveries (Fish Enhancement)	0	0	0	0	0	0	0	0	0	0	0	0	0
Deliveries	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Dept. of Parks and Rec. (State)	1	1	0	2	2	0	5	2	3	2	1	0	19
Outflow, Pyramid Diversion	25,958	284	312	536	1,523	1,474	1,538	1,532	1,479	1,540	1,645	3,935	41,756
Outflow, Angeles Tunnel	17,500	20,414	103,713	33,927	24,345	81,274	69,308	82,233	47,000	6,208	26,555	48,516	560,993
Change in Storage	1,454	3,097	3,059	-7,027	1,170	-1,852	583	2,745	5,071	-3,055	-669	-2,411	2,165
Computed Losses (-), Gains (+)	3,479	-199	3,844	-371	-615	-1,530	431	-1,300	65	-621	81	1,276	4,540
Elderberry Forebay Operation													
Inflow, Project through Castaic P-G Plant	17,500	20,414	103,713	33,927	24,345	81,274	69,308	82,233	47,000	6,208	26,555	48,516	560,993
Inflow, Natural	11,737	4,741	8,708	3,397	1,747	680	165	20	1	17	42	97	31,352
Outflow, Pumpback to Pyramid Lake	0	11	51	6,322	15,247	64,559	53,906	71,751	35,462	0	14,564	44,005	305,878
Outflow, Project Water Released to Castaic Lake	21,836	18,094	110,818	23,007	9,674	17,220	16,512	11,945	15,373	2,008	10,256	5,121	261,864
Change in Storage	5,072	5,082	4,718	7,011	-216	175	-2,523	-1,550	-4,924	3,616	803	-2,178	15,086
Computed Losses (-), Gains (+)	-2,329	-1,968	3,166	-984	-1,387	0	-1,578	-107	-1,090	-601	-974	-1,665	-9,517
Castaic Lake Operation													
Inflow, Project	21,836	18,094	110,818	23,007	9,674	17,220	16,512	11,945	15,373	2,008	10,256	5,121	261,864
Inflow, Natural	9,603	5,514	10,076	3,955	2,282	996	263	99	64	92	153	269	33,366
Delivered to Contracting Agencies	15,606	2,835	1,318	12,119	10,463	13,289	17,696	19,352	17,664	18,742	13,711	16,313	159,108
Deliveries to Recreation (State)	0	1	4	18	19	29	35	39	38	22	21	10	236
Outflow, Castaic Lagoon	0	8	2	157	0	2,190	2,575	1,839	116	0	0	420	7

Figure 1. Total Deliveries from SWP Facilities
Annual Totals

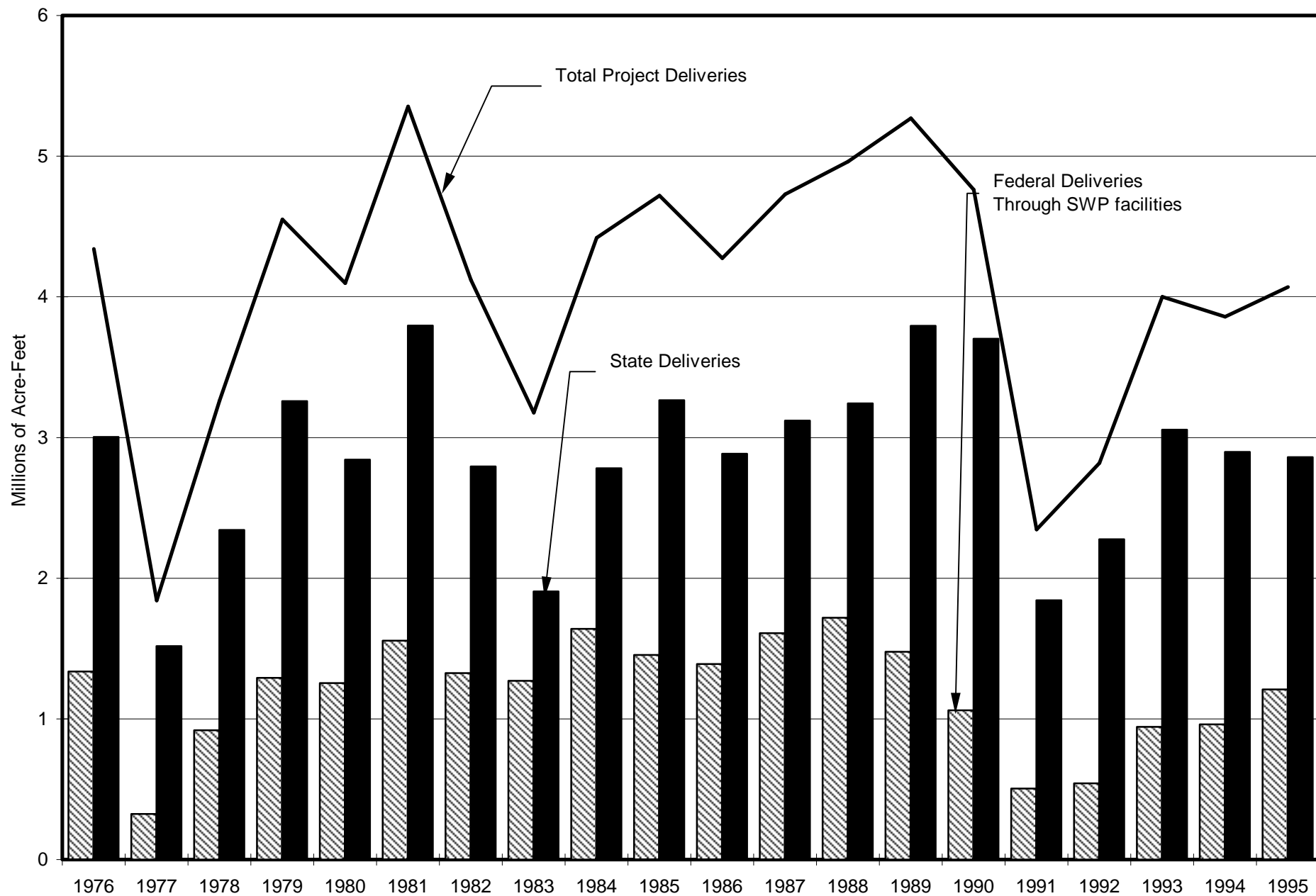


Figure 2. Combined Operation of Hyatt-Thermalito Powerplants

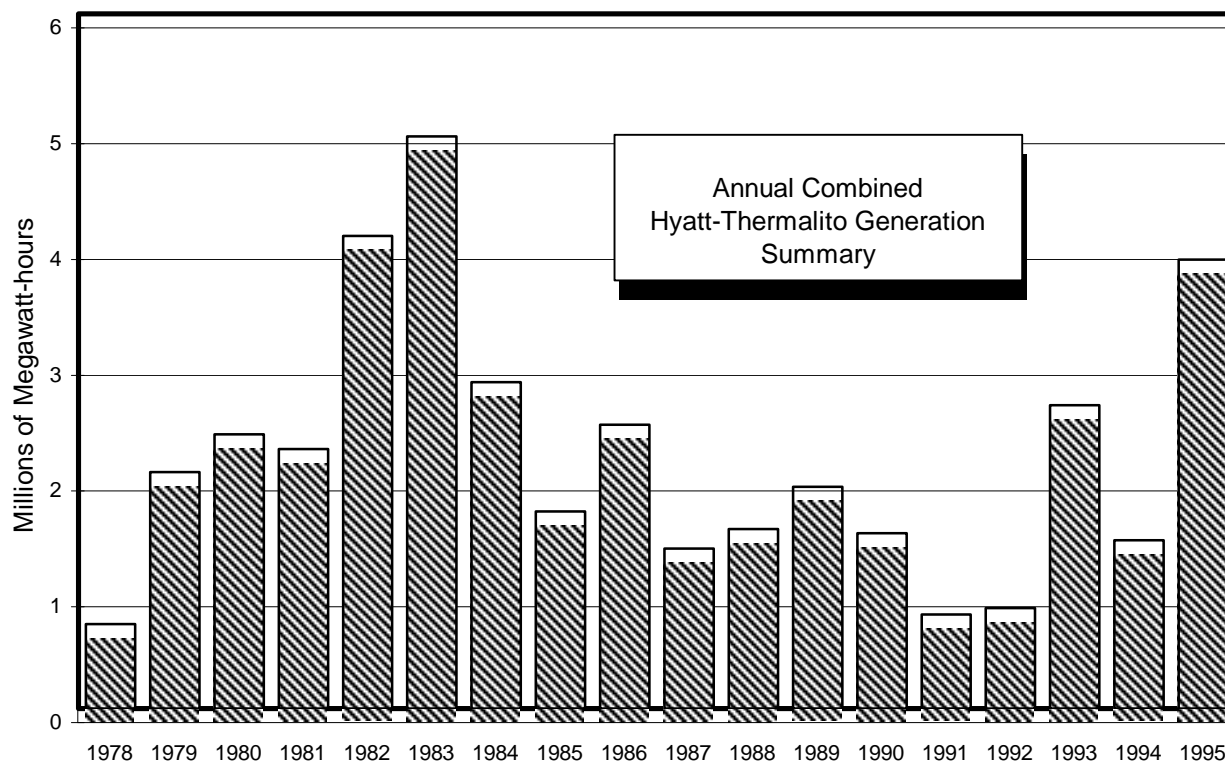
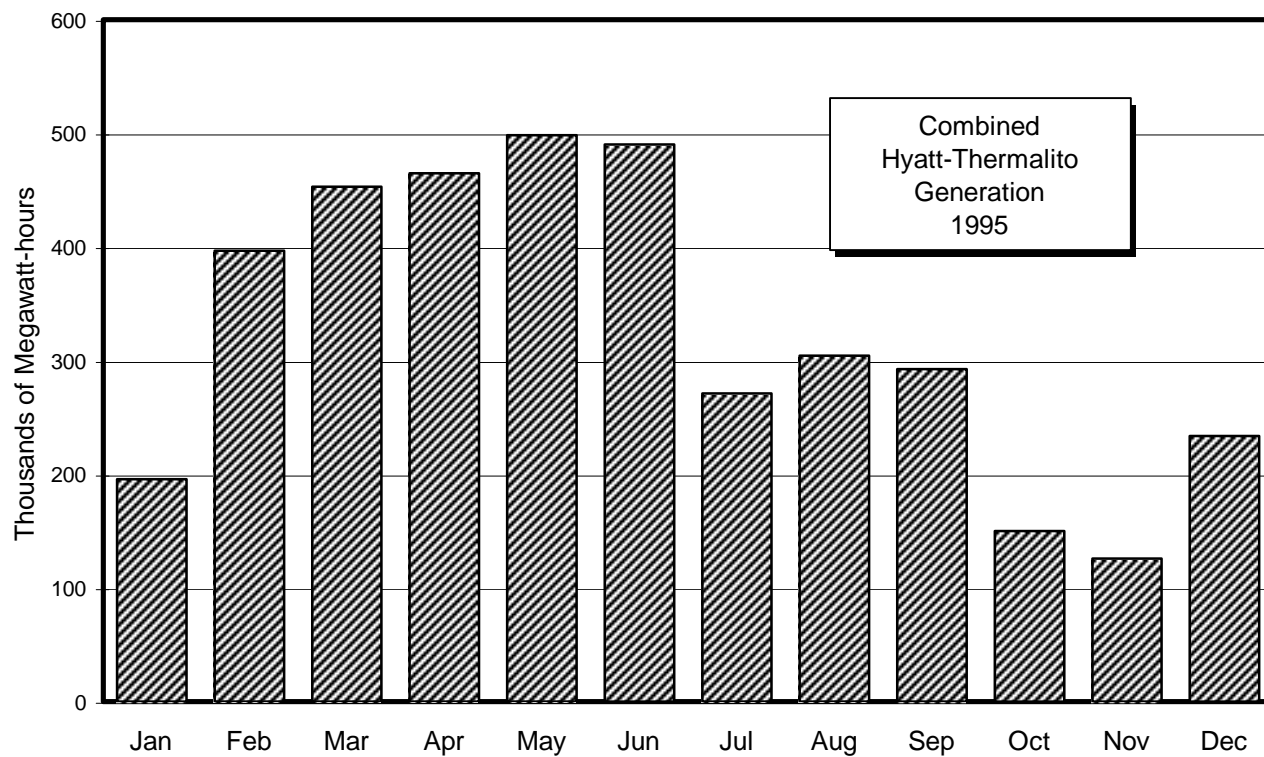
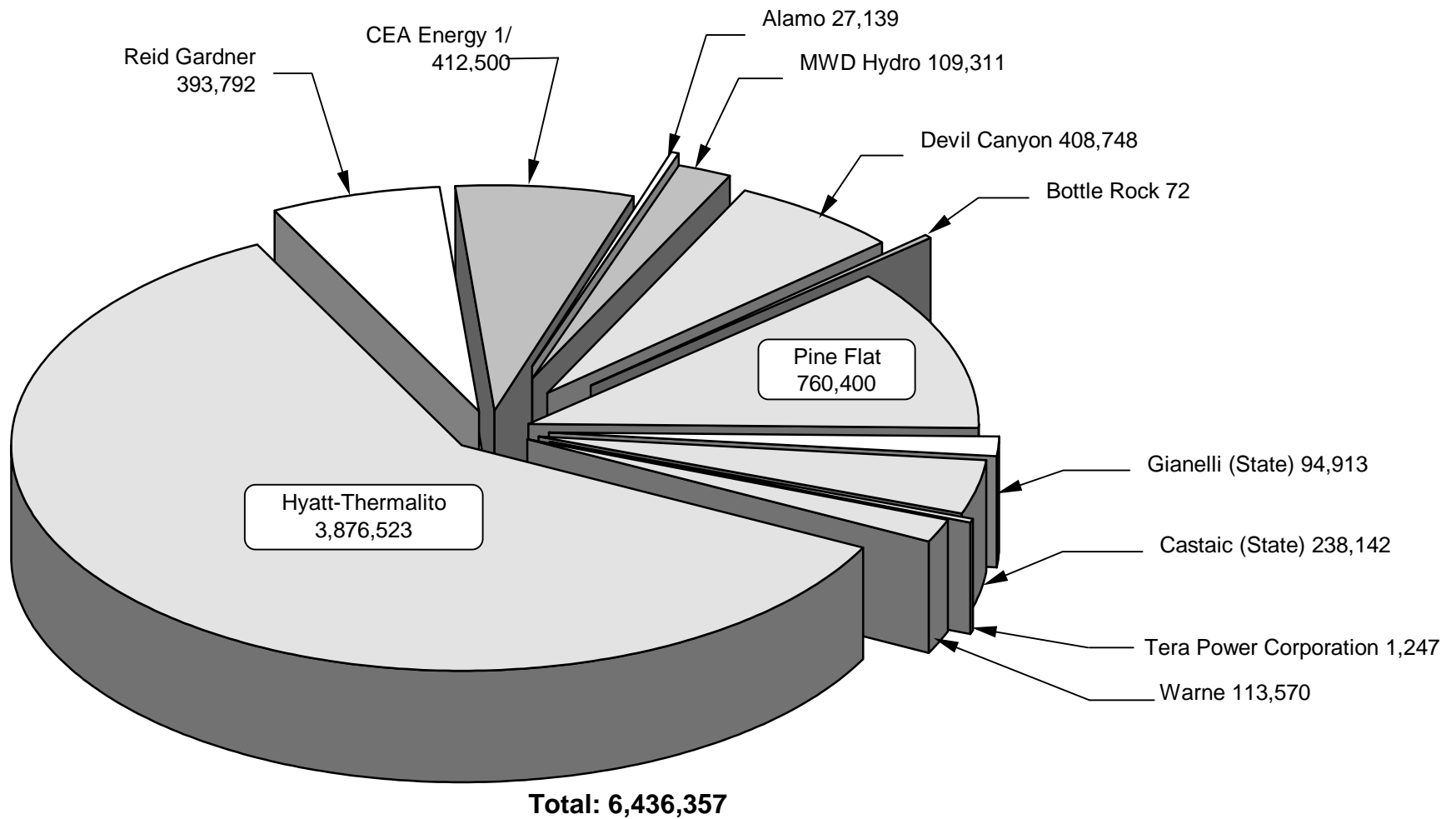


Figure 3. SWP Energy Resources

(all values in MWh)

1995



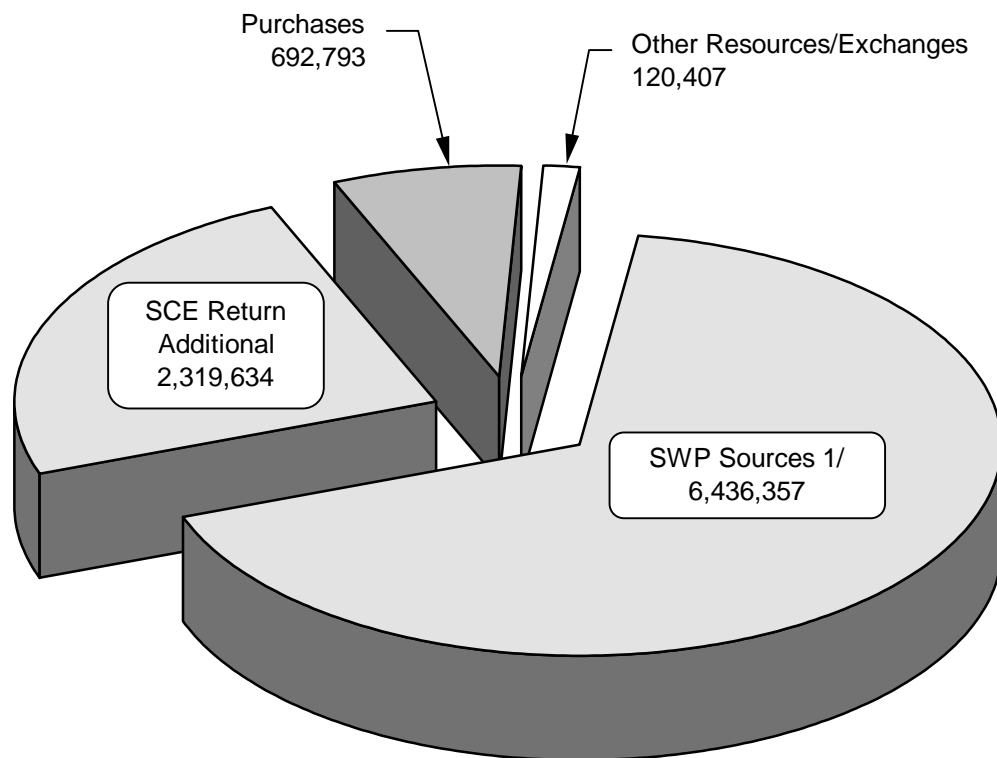
Note: Purchases, Other Sources, and SCE Return Additional are not shown here. All values are metered readings at plants and are not adjusted for transmission losses.

1/ Capacity Exchange Agreement energy.

Figure 4. Total Energy Resources

(all values in MWh)

1995



Total: 9,569,191

1/ See Figure 3 for a breakdown of this source.

2/ Capacity Exchange Agreement energy.

Purchases

Pacific Power and Light	614,822
Bonneville Power Authority	29,337
Metropolitan Water District	13,730
Puget Sound Power and Light	10,780
City and County of San Francisco	8,247
Pacific Gas and Electric	5,943
Salt River Project	2,769
Electric Clearing House, Inc.	2,525
Southern California Edison	1,900
Portland General Electric	1,710
City of Colton	536
Western Area Mid Pacific	270
Enron Power Marketing, Inc.	224
	<hr/>
	692,793

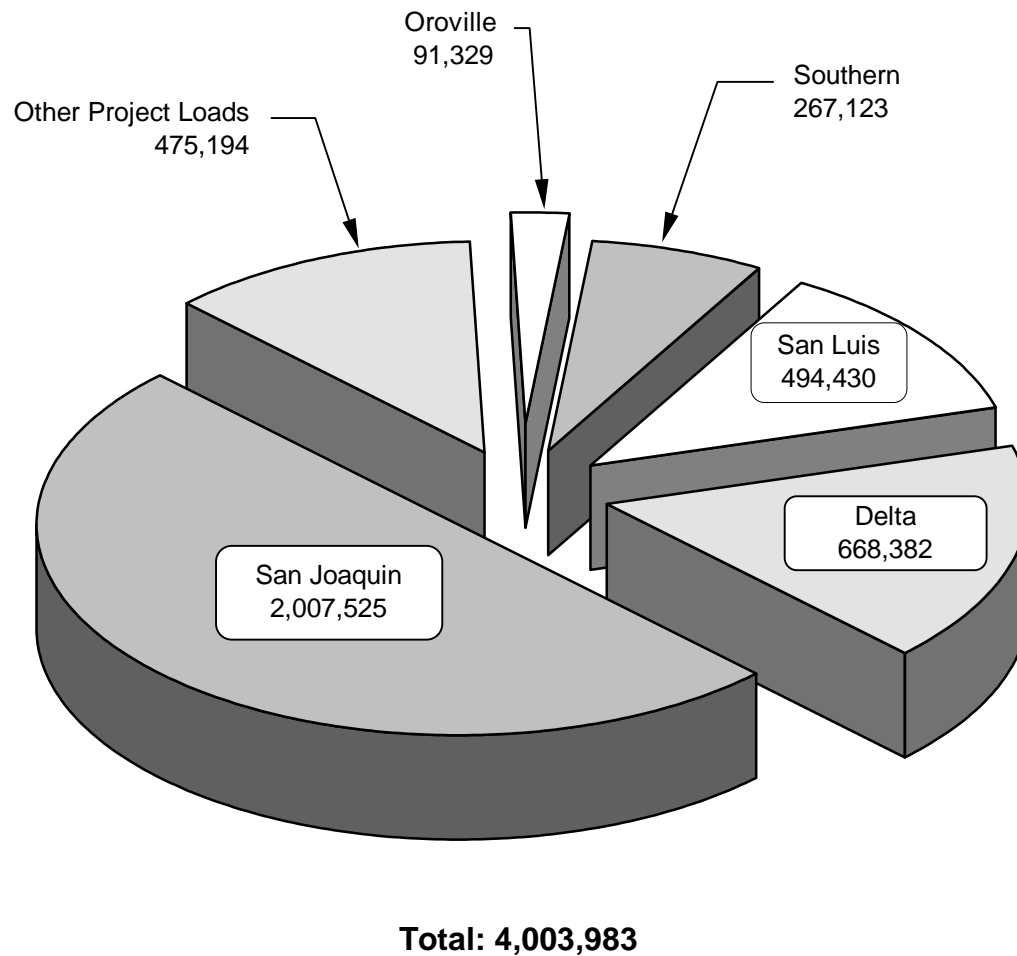
Other Resources/Exchanges

Southern California Edison	85,706
Western Area Mid Pacific	34,144
Actual Deviation	557
	<hr/>
	120,407

SCE Return Additional

Total Received from SCE	4,799,477
SCE Hyatt-Thermalito Entitlement	-1,522,145
CEA Energy 2/	-412,500
SCE Devil Canyon Entitlement	-408,748
SCE Alamo Entitlement	-27,139
MWD Hydro Entitlement	-109,311
	<hr/>
	2,319,634

Figure 5. SWP Energy Loads
(all values in MWh)
1995



Oroville Field Division

Hyatt-Thermalito Complex (Pumpback and Station Service)	91,329
	<hr/> 91,329

Delta Field Division

North Bay	12,992
South Bay	55,149
Del Valle	116
Banks	599,436
Bottle Rock (Station Service)	689
	<hr/> 668,382

San Luis Field Division

Gianelli	262,019
Dos Amigos	231,301
Pine Flat (Station Service)	1,110
	<hr/> 494,430

San Joaquin Field Division

Las Perillas	7,497
Badger Hill	20,097
Buena Vista	177,867
Teerink	167,509
Chrisman	364,007
Edmonston	1,270,548
	<hr/> 2,007,525

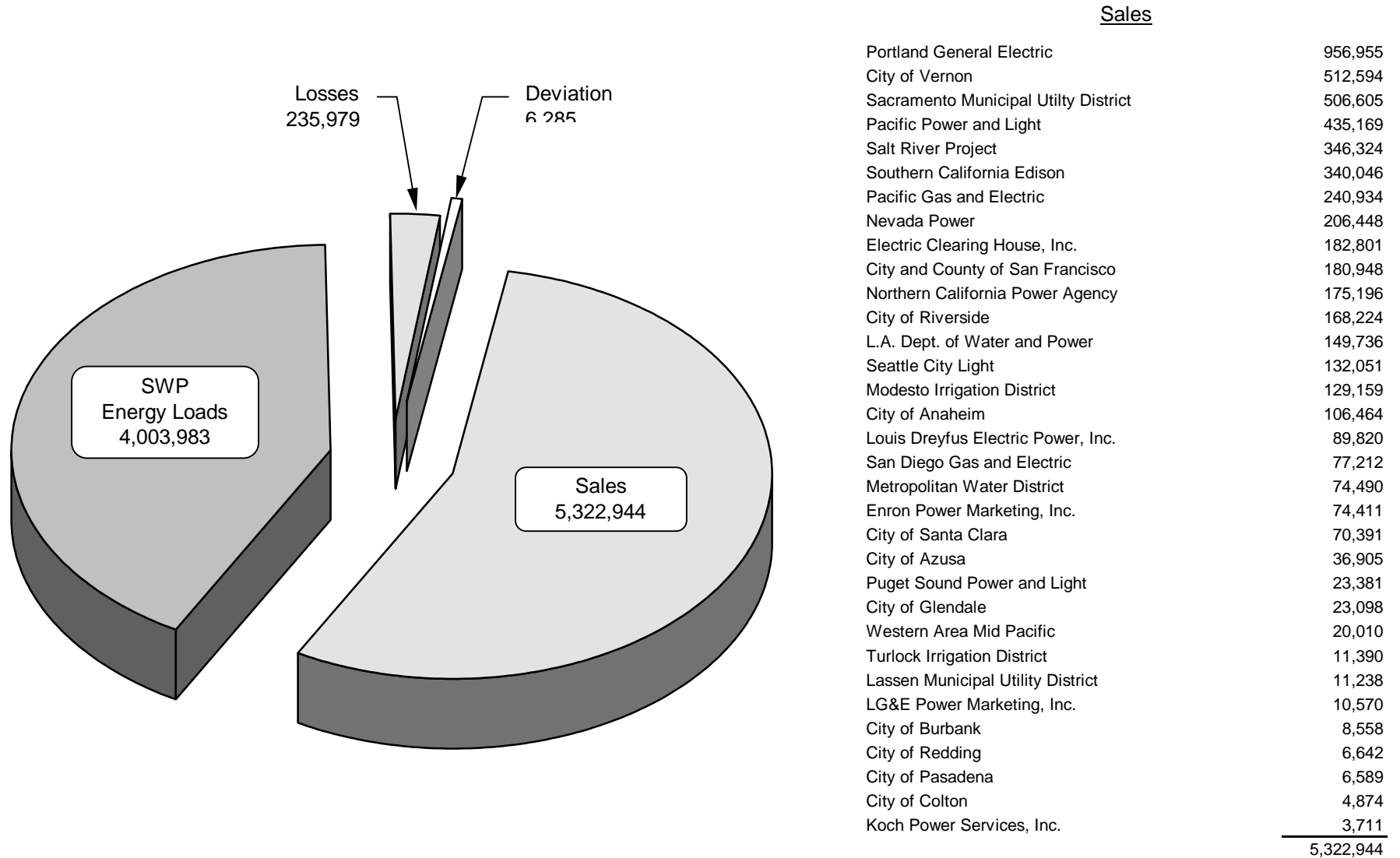
Southern Field Division

Oso	54,858
Mojave	384
Pearblossom	210,474
Warne (Station Service)	1,407
	<hr/> 267,123

Other Project Loads

Southern California Edison	412,500
Nevada Power Authority	7,282
Pacific Gas and Electric	55,263
South Bay Station Service	149
	<hr/> 475,194

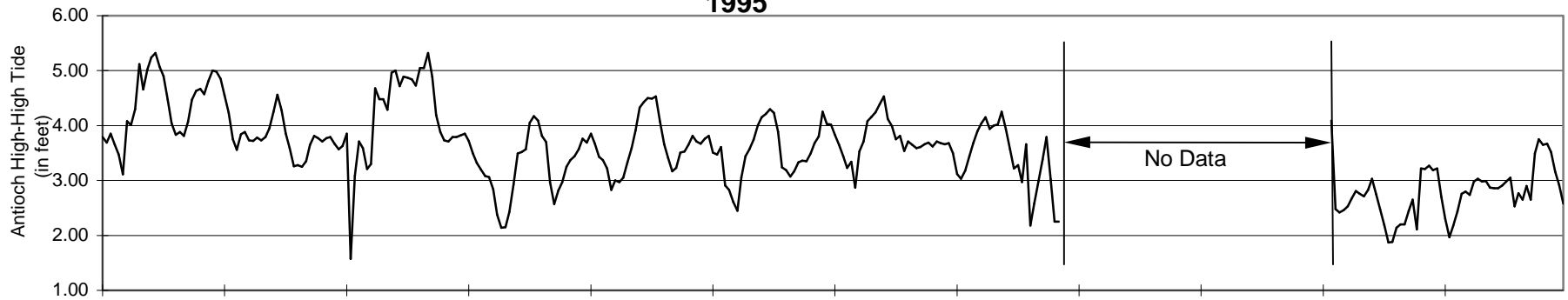
Figure 6. Total Energy Loads
(all values in MWh)
1995



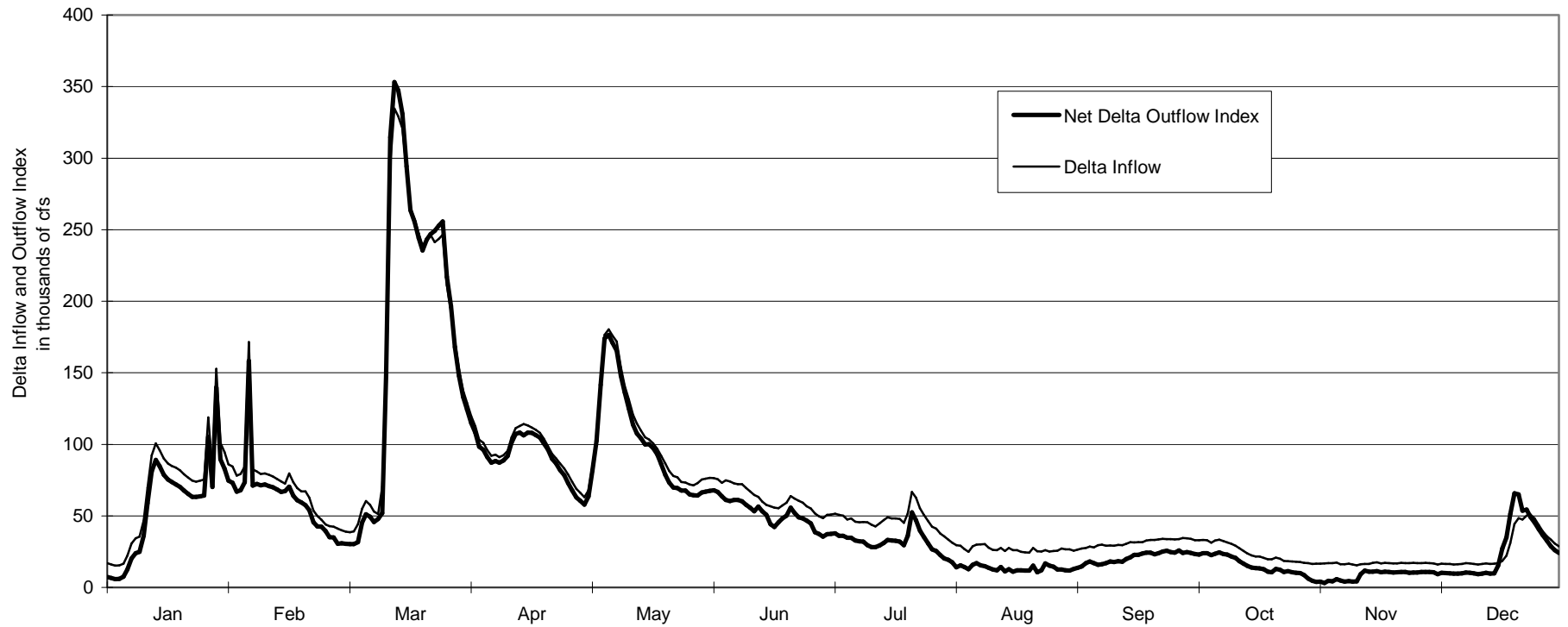
Total: 9,569,191

Note: See Figure 5 for breakdown of SWP Energy Loads.

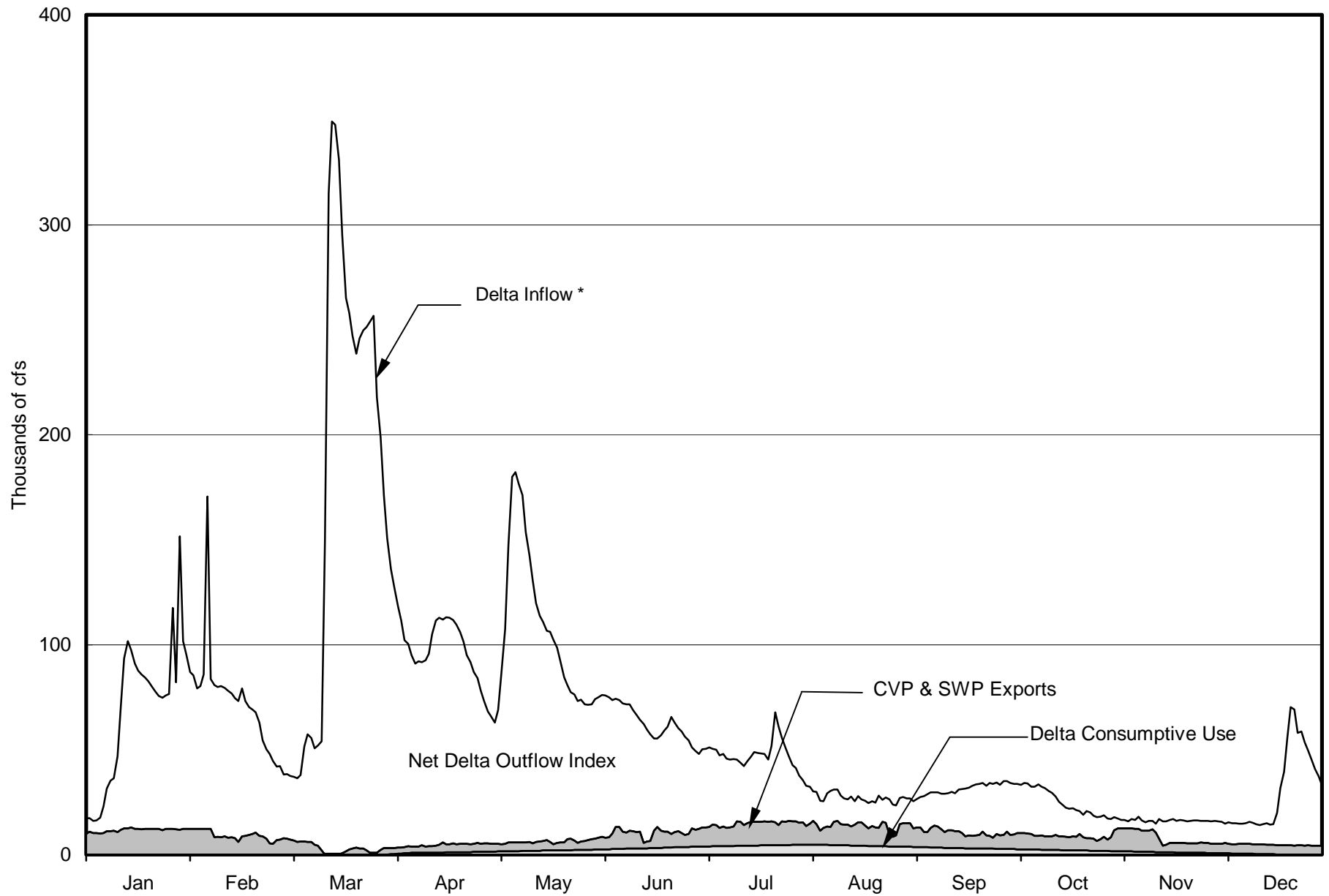
Figure 7. Delta Tide, Inflow, and Net Delta Outflow Index
1995



Note: Missing data points are unavailable because equipment was destroyed by vandals and new equipment required calibration.



**Figure 8. Coordinated Delta Operations
1995**



* Delta inflow = Exports + Net Delta Outflow Index + Consumptive Use.

**Figure 9. Coordinated Delta Operations
Lagged Storage Withdrawals
1995**

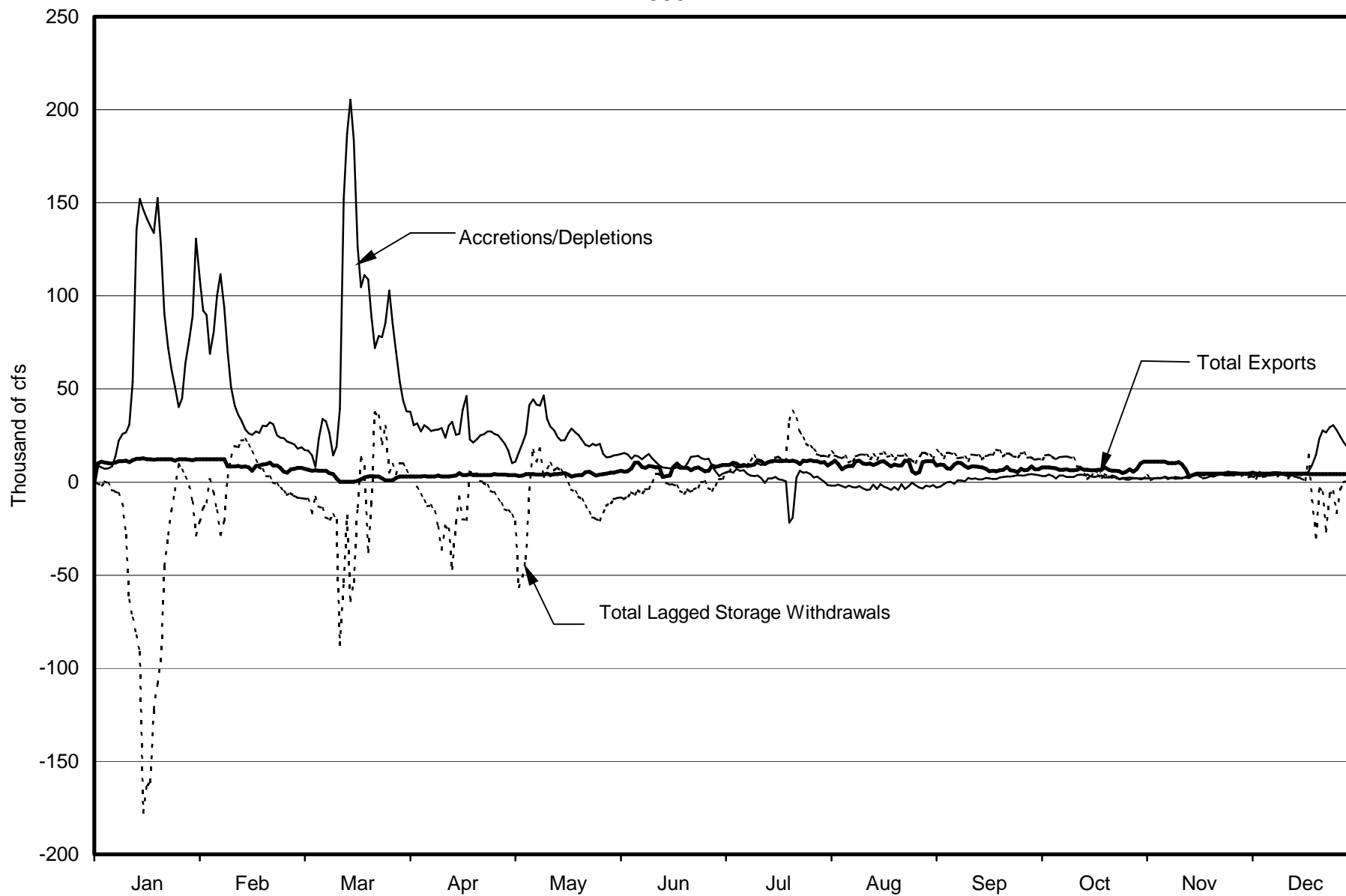


Figure 10. Coordinated Delta Operations
Delta Exports
1995

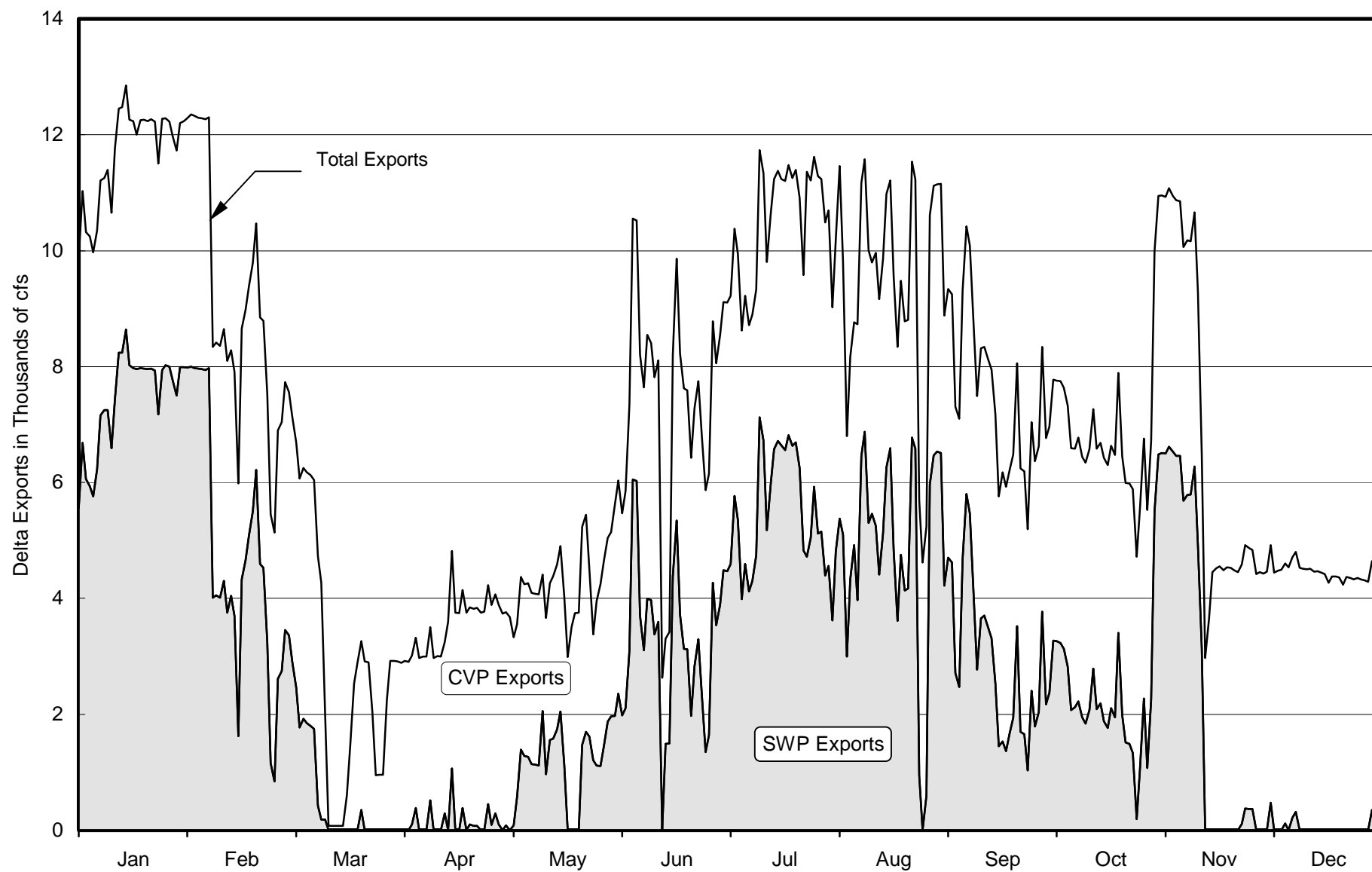


Figure 11. Oroville-Thermalito Complex

Inflow, Releases, and Diversions

1995

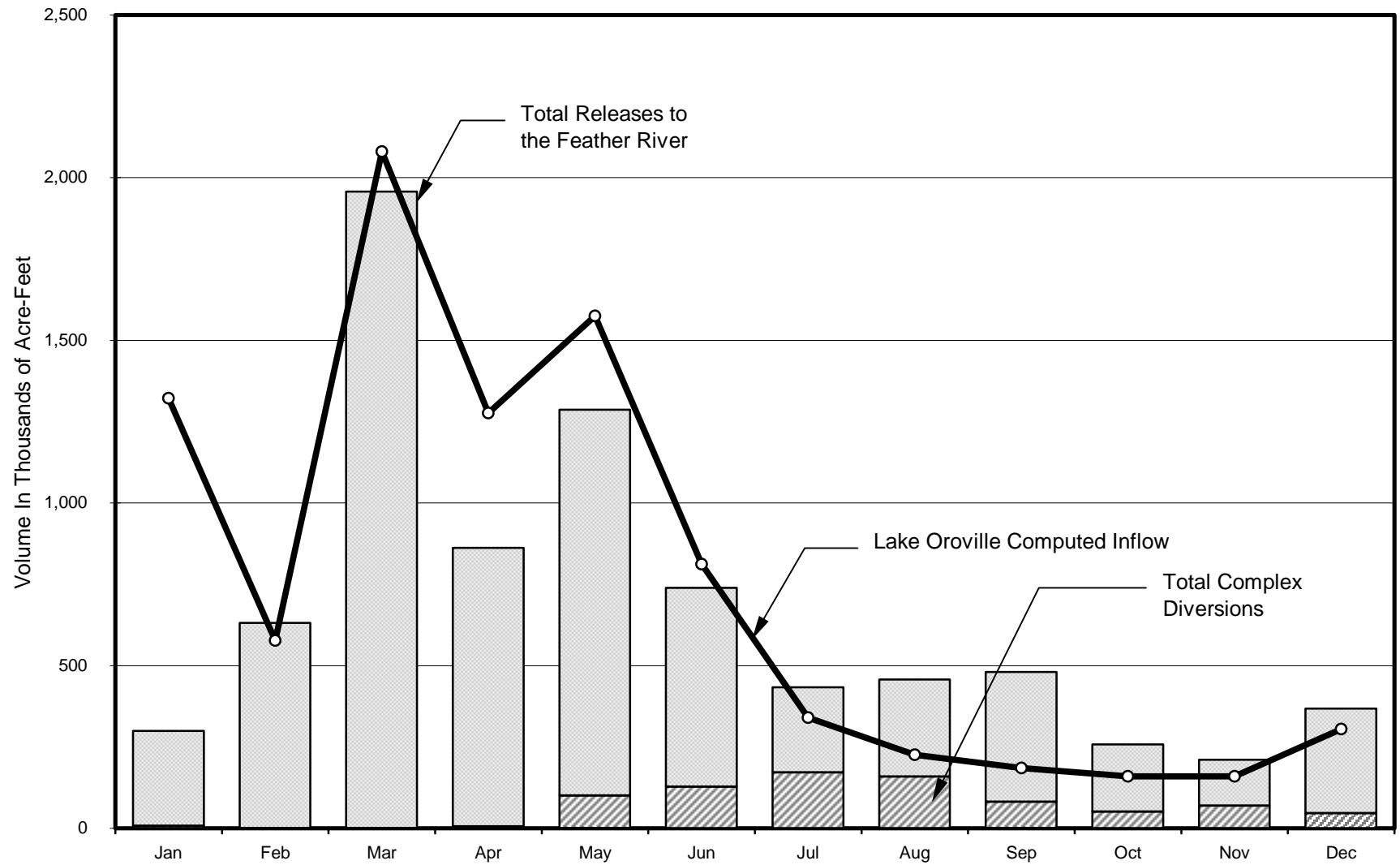
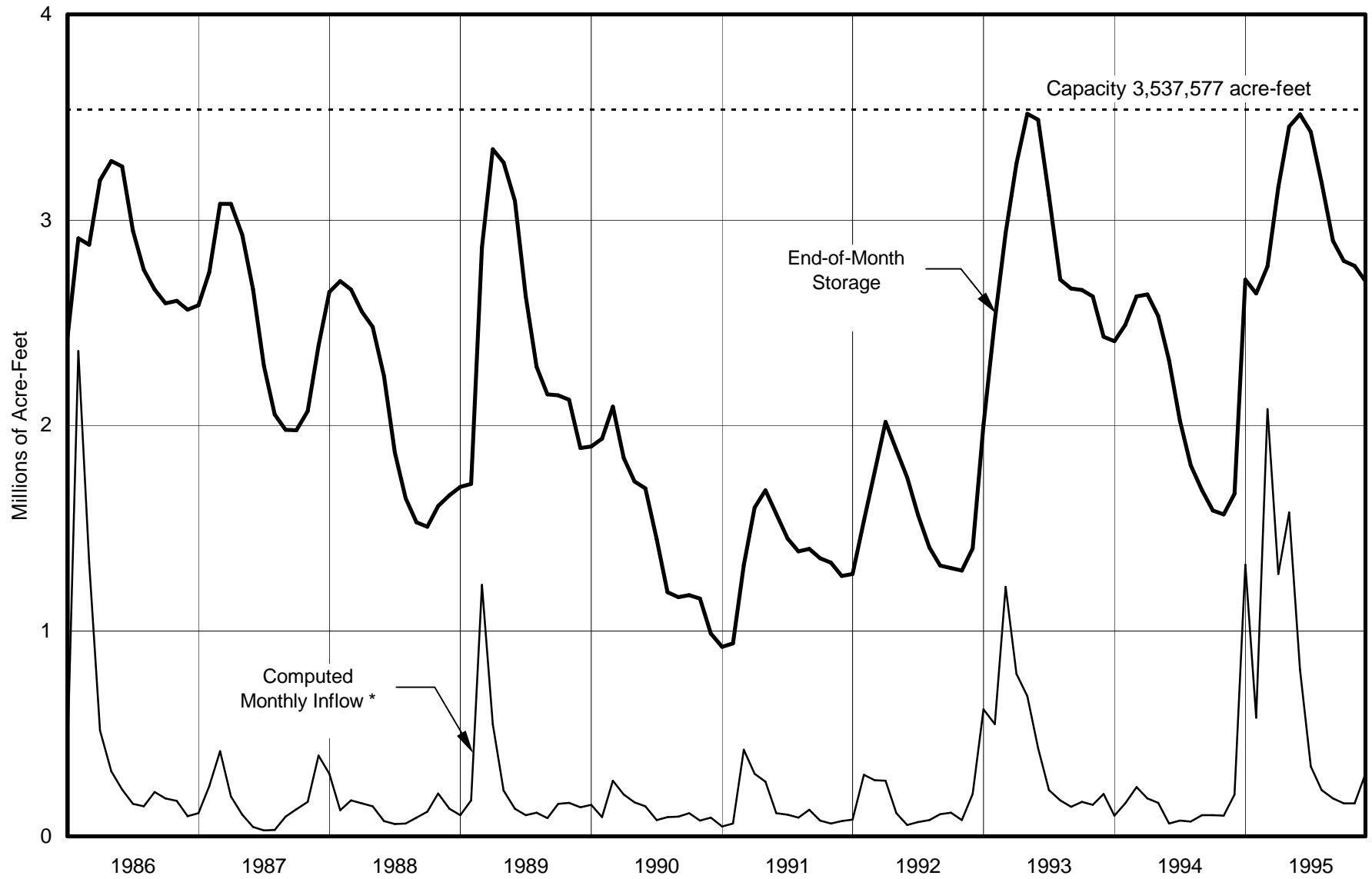


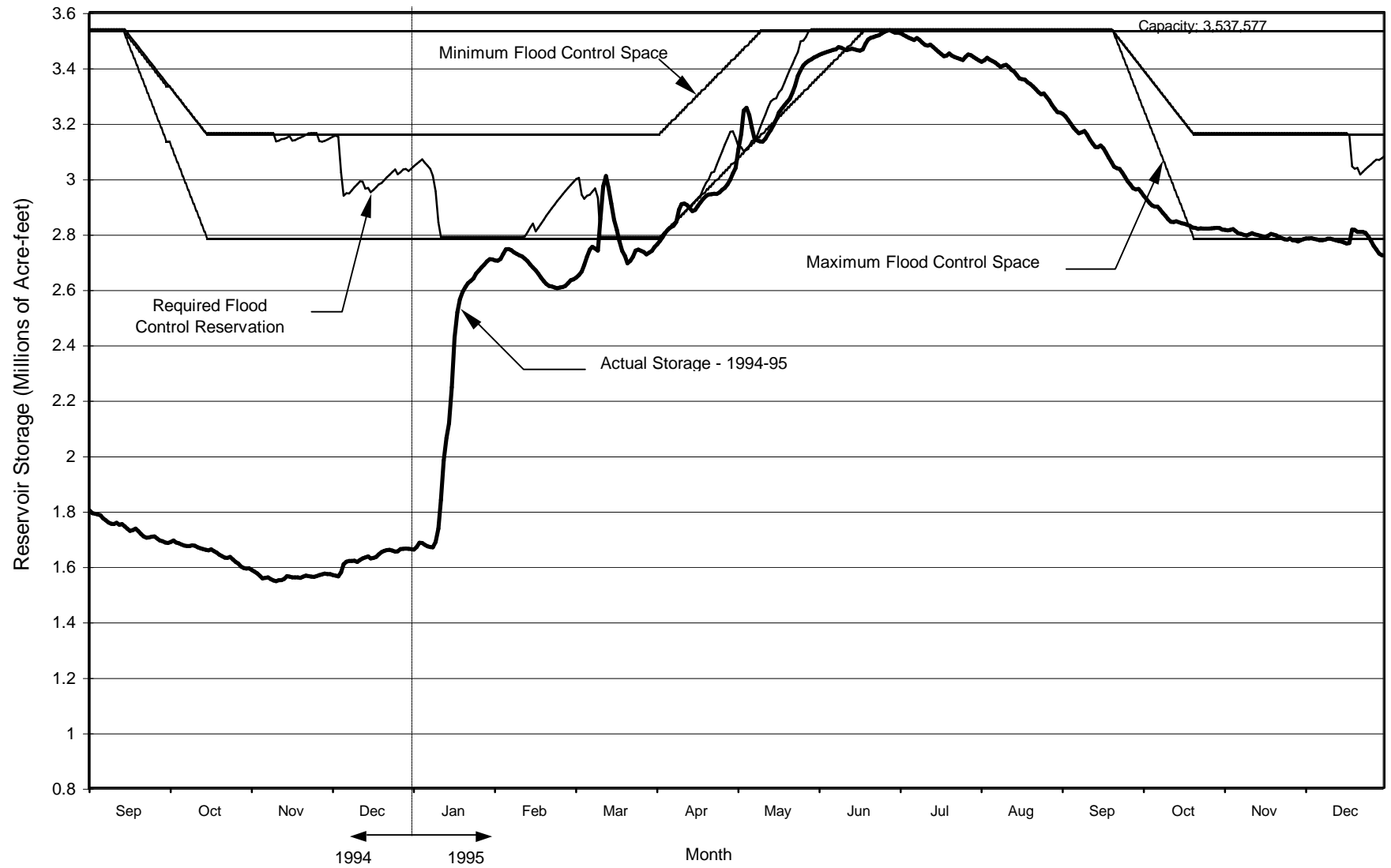
Figure 12. Historical Lake Oroville Operation



* Excludes pumpback.

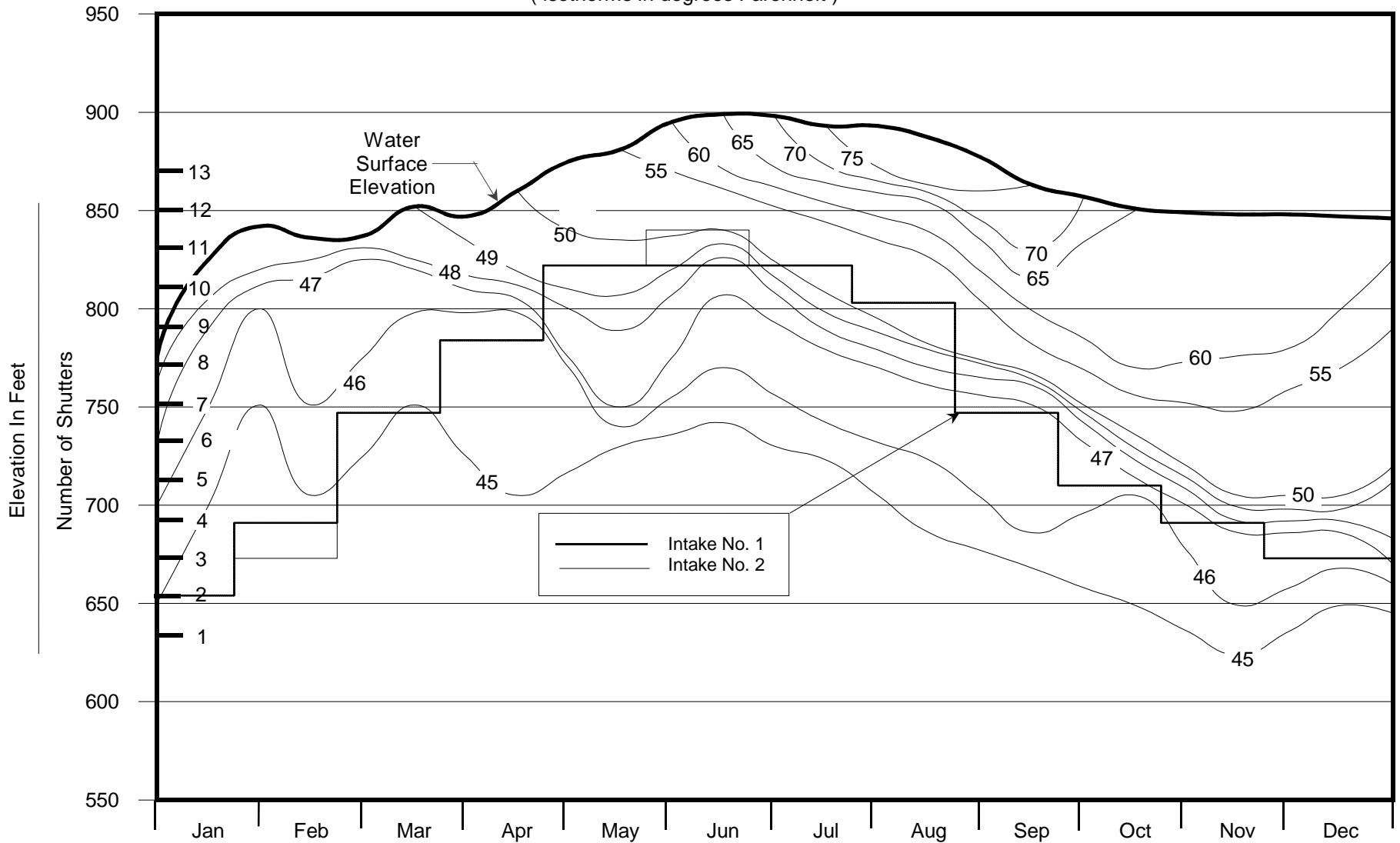
Figure 13. Operation of Lake Oroville for Flood Control

1994-95



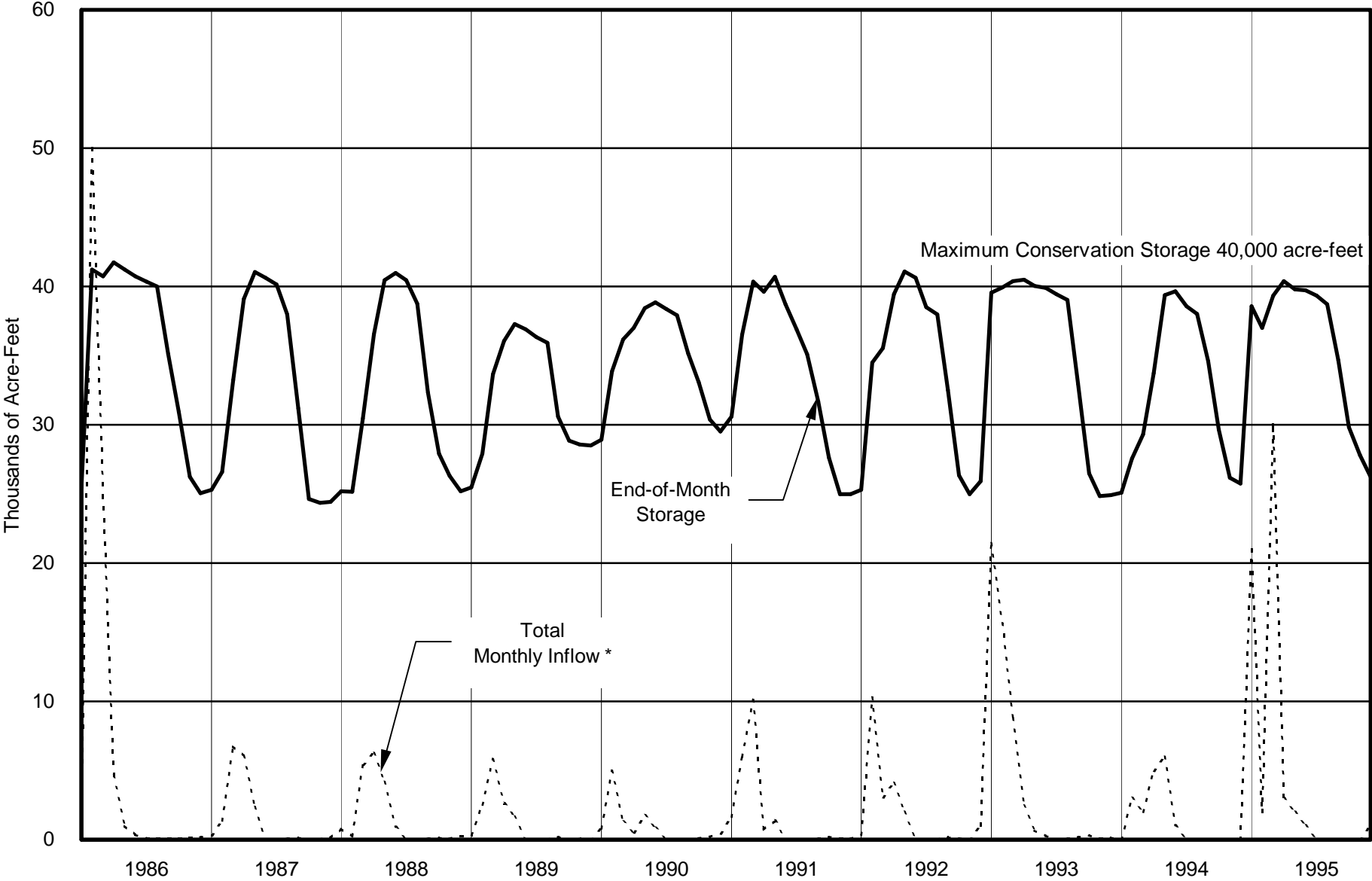
**Figure 14. Lake Oroville Temperatures
1995**

(isotherms in degrees Farenheit)



Note: Temperature profile data is collected once per month and interpolated for the rest of the year.

Figure 15. Historical Lake Del Valle Operation



* Natural and pumped inflows.

Figure 16. Historical San Luis Reservoir Operation

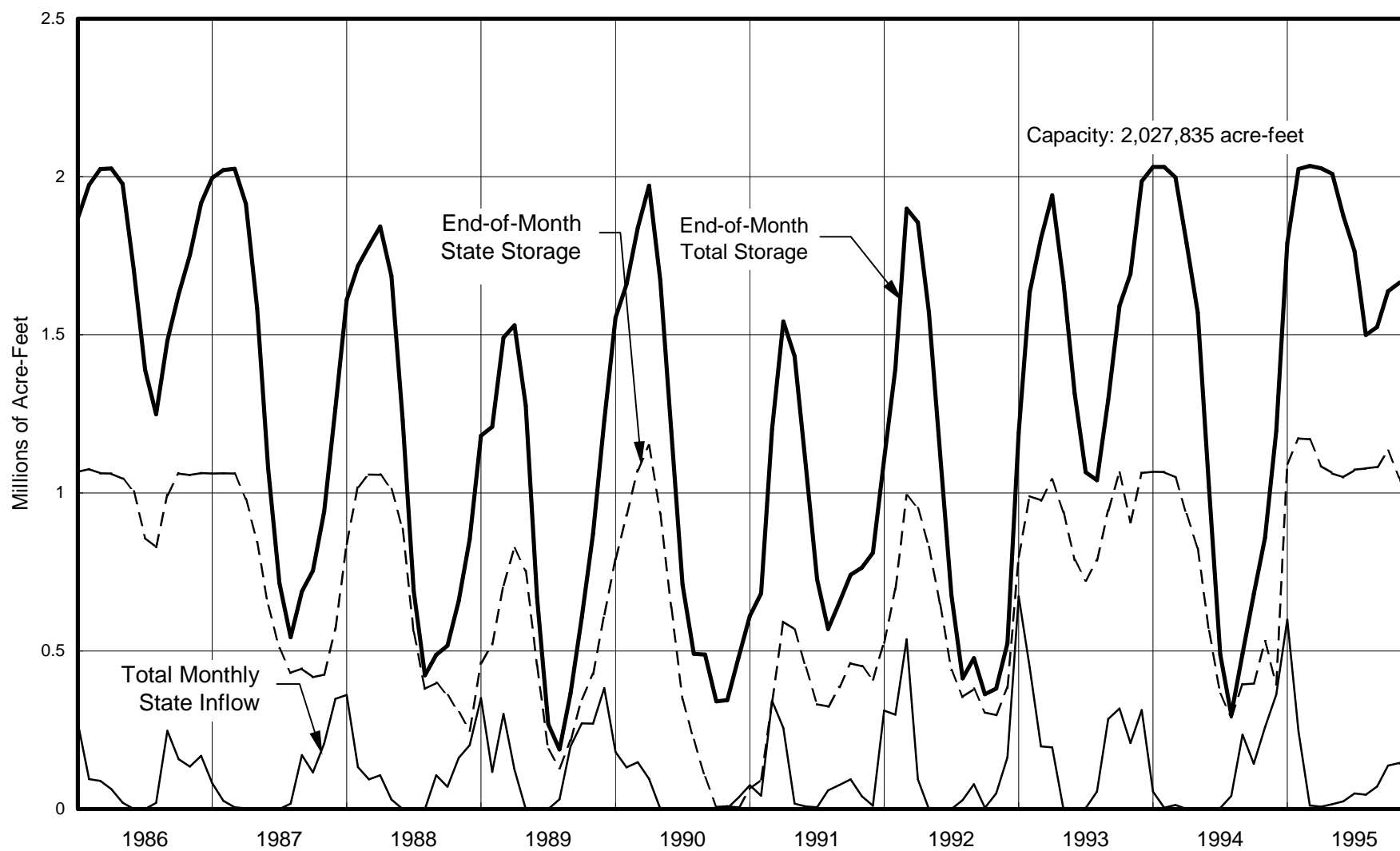
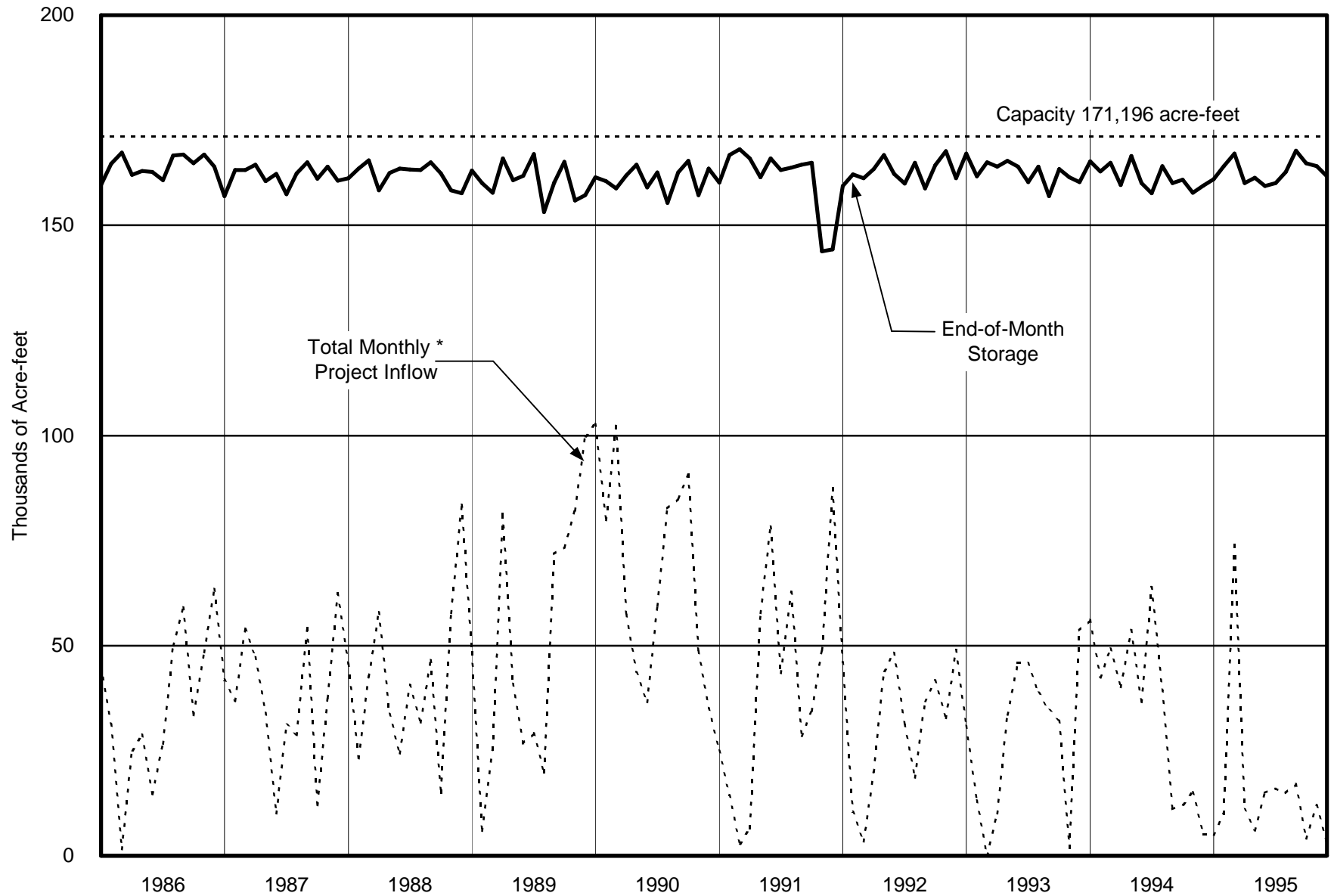


Figure 17. Historical Pyramid Lake Operation



* Excludes pumpback by LADWP through Castaic Powerplant.

Figure 18. Historical Castaic Lake Operation

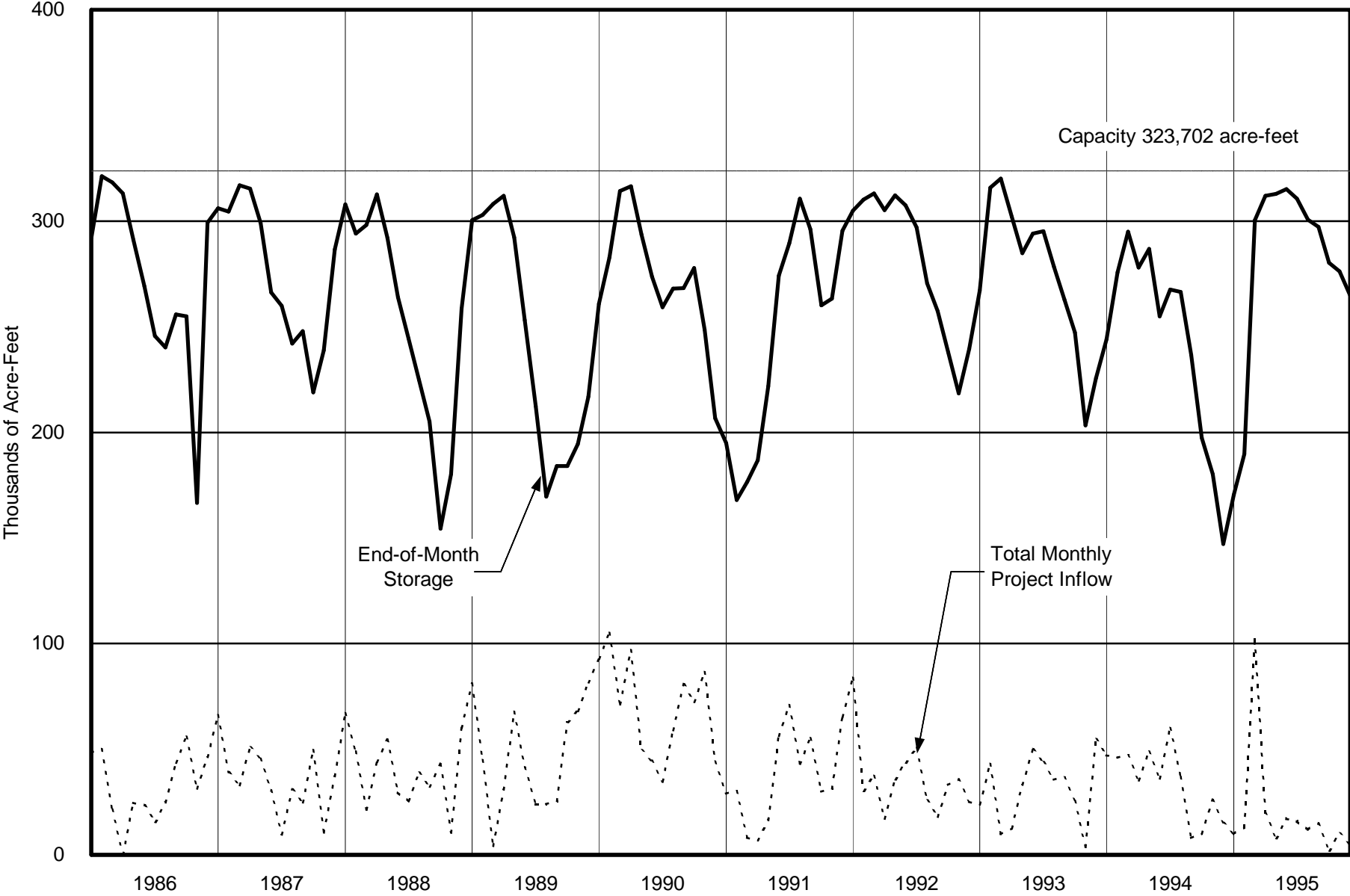


Figure 19. Historical Silverwood Lake Operation

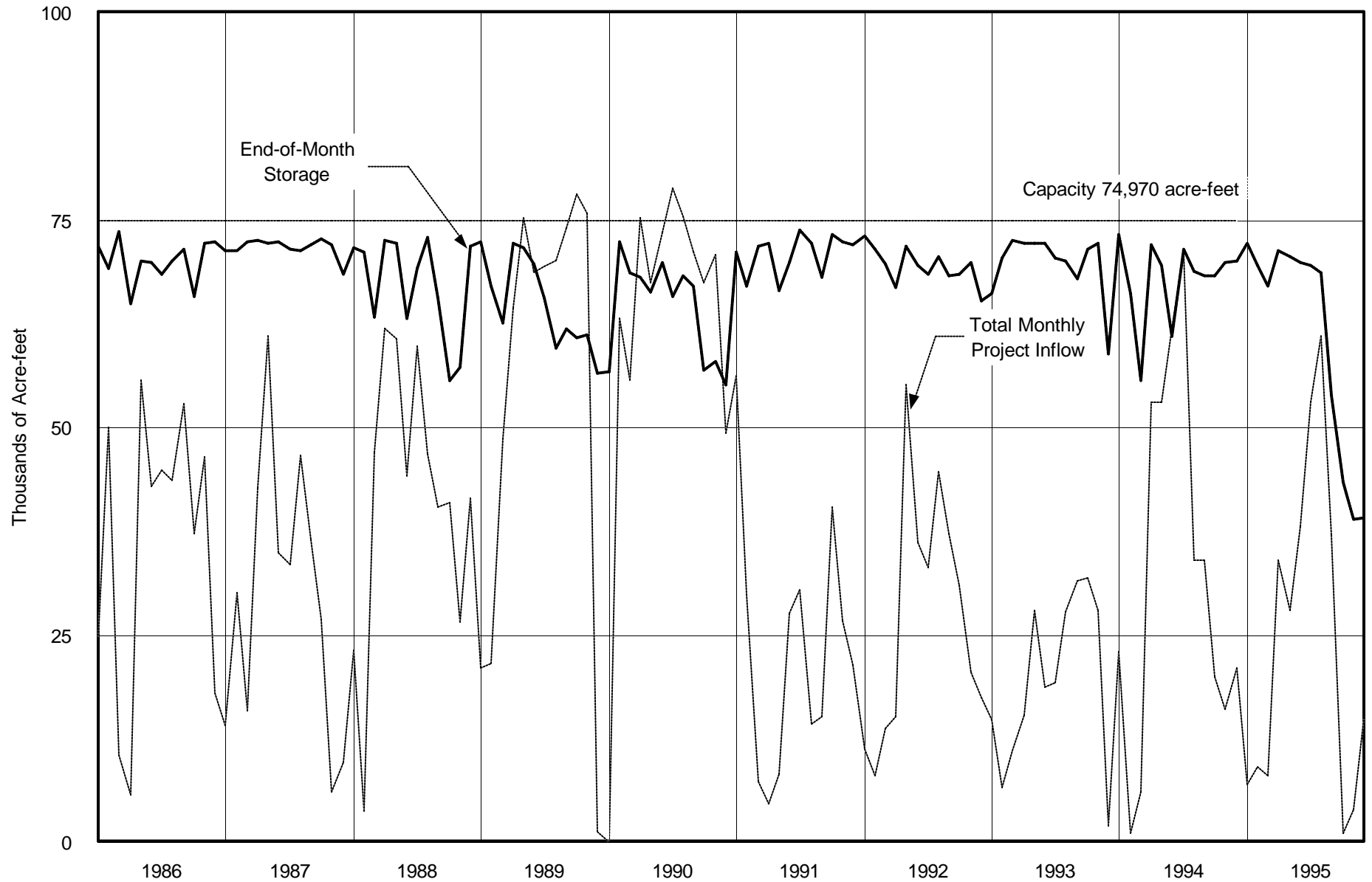
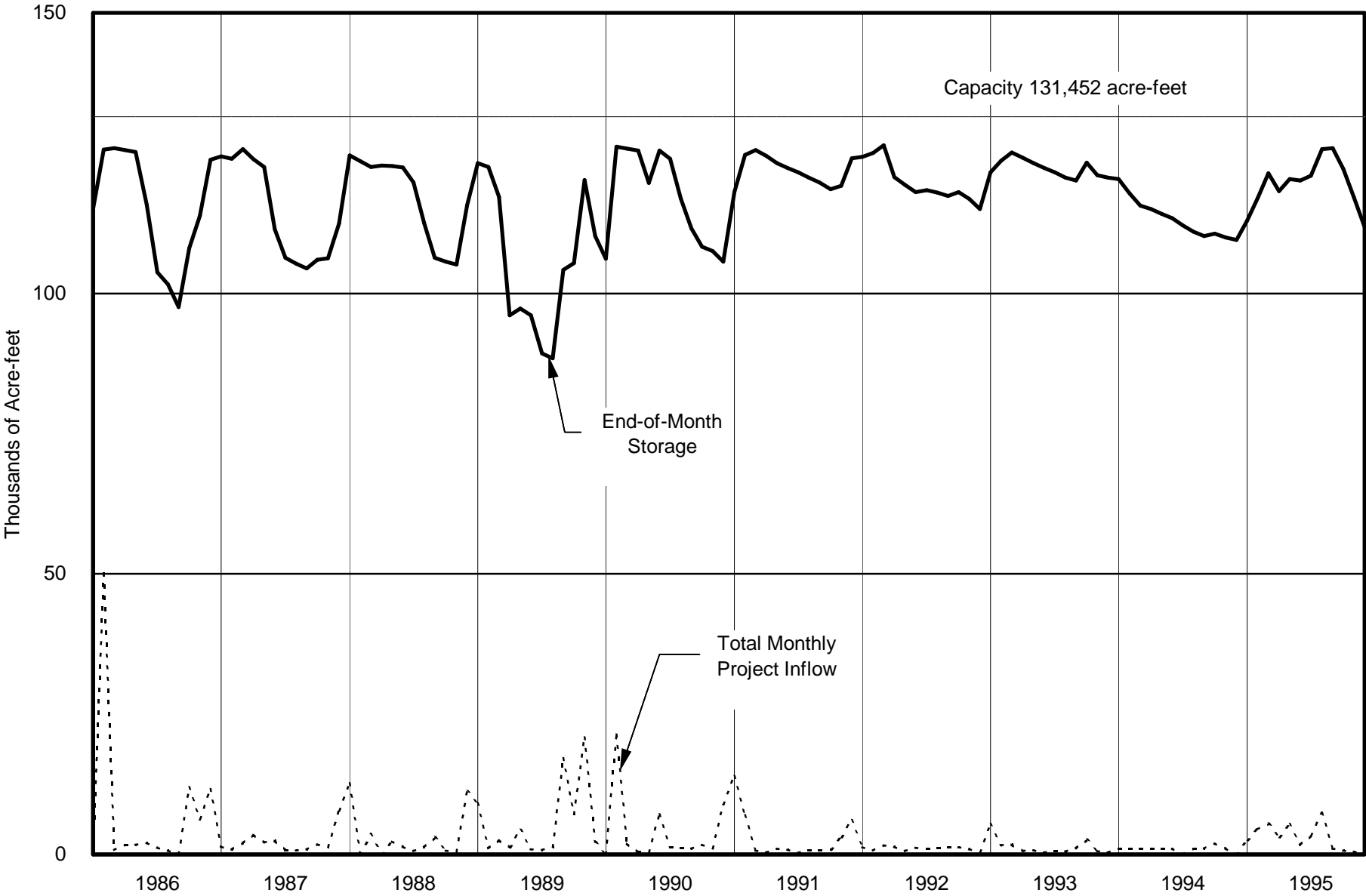
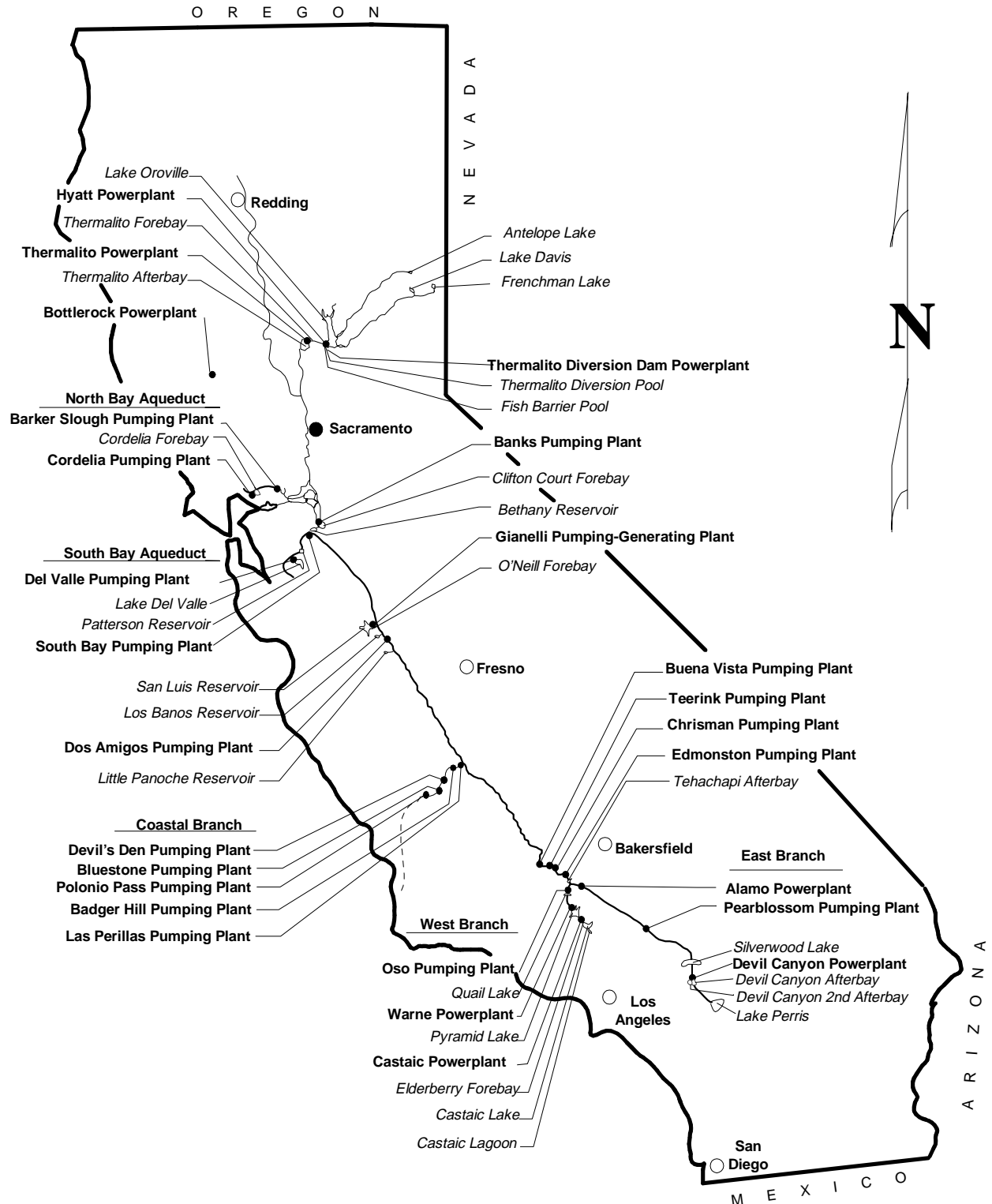


Figure 20. Historical Lake Perris Operation



Map 1

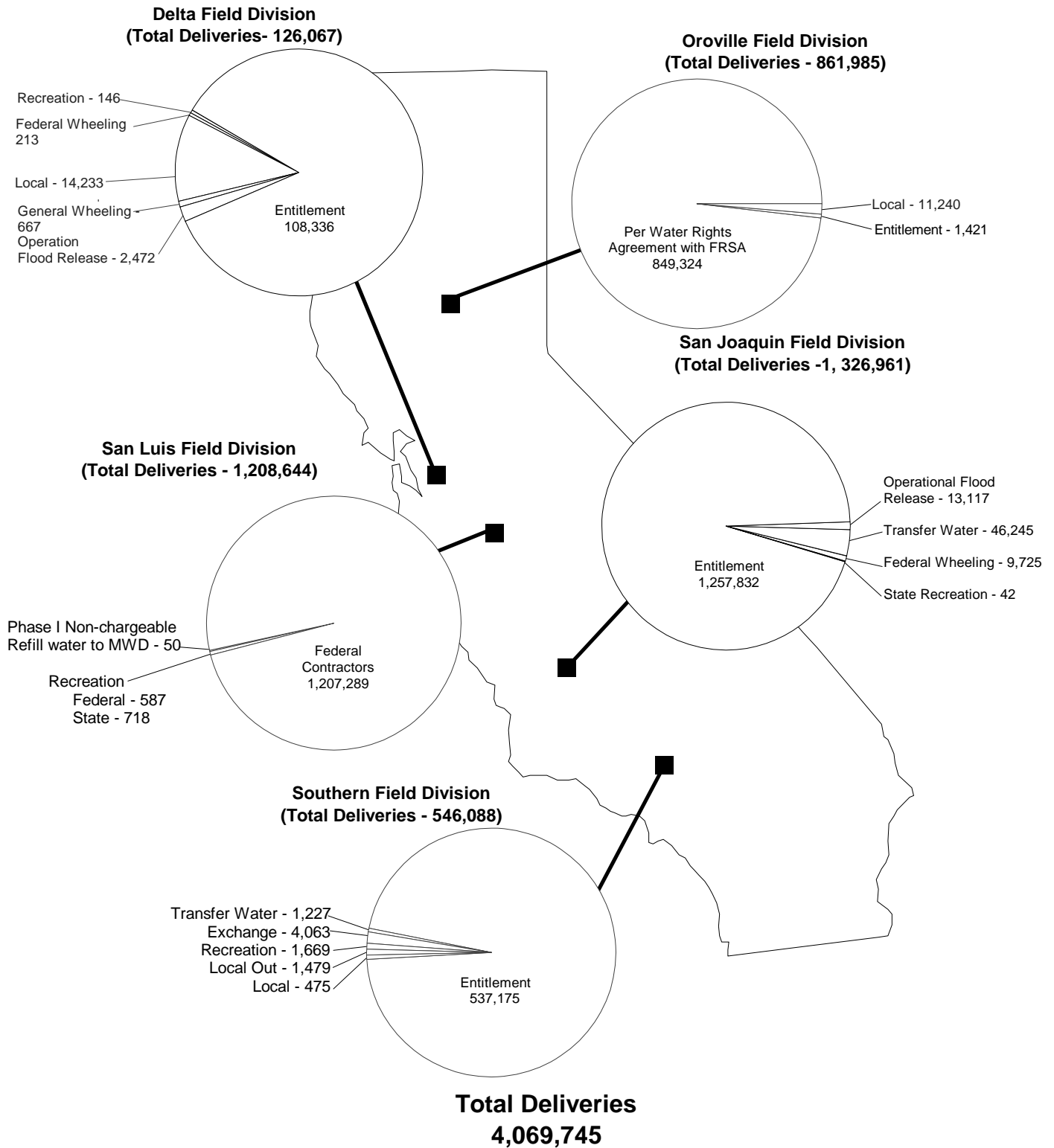
Project Facilities



Map 2
Field Division Boundaries



Map 3
1995 Water Deliveries
(in acre-feet)



Glossary

accretion - the water accumulated and retained within a service area.

acre-foot (AF) - a quantity or volume of water covering one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

active storage capacity - the total usable reservoir capacity available for seasonal or cyclic water storage. It is gross reservoir capacity minus inactive storage capacity.

afterbay - a reservoir that regulates fluctuating discharges from a hydroelectric power plant or a pumping plant.

alluvium - a stratified bed of sand, gravel, silt, and clay deposited by flowing water.

aquifer - a geologic formation that stores and transmits water and yields significant quantities of water to wells and springs.

average annual runoff - the average value of annual runoff amounts for a specified area calculated for a selected period of record that represents average hydrologic conditions.

balanced water conditions - exist when upstream reservoir storage releases, plus other inflows, approximately equal the water supply needed to (1) satisfy Sacramento Valley and Sacramento-San Joaquin Delta in-basin needs, including Delta water quality requirements, and (2) meet export needs.

benthic invertebrates - aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water. Examples: clams, crayfish, and a wide variety of worms.

biota - all living organisms of a region, as in a stream or other body of water.

brackish water - water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water.

carriage water - the amount of water needed above an increased export so as to not increase salinity in the Delta.

conjunctive use - the operation of a ground water basin in combination with a surface water storage and conveyance system. Water is stored in the ground water basin for later use by intentionally recharging the basin during years of above-average water supply.

Decision 1485 operating criteria - standards for operating water project facilities under Water Rights Decision 1485 regarding the Sacramento-San Joaquin Delta and Suisun Marsh, adopted by the State Water Resources Control Board, August 1978.

Delta consumptive use - the sum of evapotranspiration and changes in soil moisture of Delta lands and evaporation from Delta channels.

Delta outflow index - a calculated approximation of this seaward freshwater outflow as it passes Chipps Island near Pittsburg, beyond the confluence of the Sacramento and San Joaquin Rivers.

depletion - the water consumed within a service area and no longer available as a source of supply.

dissolved organic compounds - carbon substances dissolved in water.

drainage basin - the area of land from which water drains into a river; for example, the Sacramento River Basin, in which all land area drains into the Sacramento River. Also called, "catchment area," "watershed," or "river basin."

drought condition - hydrologic conditions during a defined drought period during which rainfall and runoff are much less than average.

ecology - the study of the interrelationships of living organisms to one another and to their surroundings.

ecosystem - recognizable, relatively homogeneous units, including the organisms they contain, their environment, and all the interactions among them.

effluent - waste water or other liquid, partially or completely treated or in its natural state, flowing from a treatment plant.

environment - the sum of all external influences and conditions affecting the life and development of an organism or ecological community; the total social and cultural conditions.

estuary - the lower course of a river entering the sea influenced by tidal action where the tide meets the river current.

evapotranspiration (ET) - the quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. Quantitatively, it is usually expressed in terms of depth of water per unit area during a specified period of time.

evapotranspiration of applied water (ETAW) - the portion of the total evapotranspiration which is provided by irrigation.

forebay - a reservoir or pond situated at the intake of a pumping plant or power plant to stabilize water levels; also a storage basin for regulating water for percolation into ground water basins.

fry - a recently hatched fish.

gross reservoir capacity - the total storage capacity available in a reservoir for all purposes, from the streambed to the normal maximum operating level. Includes dead (or inactive) storage, but excludes surcharge (water temporarily stored above the elevation of the top of the spillway).

ground water - water that occurs beneath the land surface and completely fills all pore spaces of the alluvium, soil or rock formation in which it is situated.

ground water basin - a ground water reservoir, defined by an overlying land surface and the underlying aquifers that contain water stored in the reservoir.

ground water overdraft - the condition of a ground water basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average.

ground water recharge - increases in ground water storage by natural conditions or by human activity.

ground water table - the upper surface of the zone of saturation, except where the surface is formed by an impermeable body.

hydraulic barrier - a barrier developed in the estuary by release of fresh water from upstream reservoirs to prevent intrusion of sea water into the body of fresh water.

hydrologic balance - an accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period of time.

hydrologic basin - the complete drainage area upstream from a given point on a stream.

hydrologic region - a study area, consisting of one or more planning subareas.

joint-use facilities - specific pumping plants, power plants, canals, and reservoirs in which both State and federal agencies participated in the construction, use, and maintenance.

land subsidence - the lowering of the natural land surface in response to earth movements; lowering of fluid pressure (or lowering of ground water level); removal of underlying supporting materials by mining or solution of solids, either artificially or from natural causes; compaction caused by wetting (hydrocompaction); oxidation of organic matter in soils; or added load on the land surface.

megawatt - one million watts.

milligrams per liter (mg/L) - the weight in milligrams of any substance dissolved in one liter of liquid; nearly the same as parts per million.

natural flow - the flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modification in land use.

percolation - the downward movement of water throughout the soil or alluvium to a ground water table.

permeability - the capability of soil or other geologic formations to transmit water.

phytoplankton - minute plants, usually algae, that live suspended in bodies of water and that drift about because they cannot move by themselves or because they are too small or too weak to swim effectively against a current.

pollution (of water) - the alteration of the physical, chemical, or biological properties of water by the introduction of any substance into water that adversely affects any beneficial use of water.

prior water right - a water designation used for water delivered based on its use prior to SWP construction.

pumping-generating plant - a plant at which the turbine-driven generators can also be used as motor-driven pumps.

recharge basin - a surface facility, often a large pond, used to increase the percolation of surface water into a ground water basin.

riparian vegetation - vegetation growing on the banks of a stream or other body of water.

runoff - the total volume of surface flow from an area during a specified time.

Sacramento River index - the sum of the Sacramento Valley's unimpaired runoff at the following four locations: Sacramento River near Red Bluff; total Feather River inflow to Lake Oroville; Yuba River at Smartville; and total American River inflow to Folsom Lake.

salinity - generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. See **total dissolved solids**.

salinity intrusion - the movement of salt water into a body of fresh water. It can occur in either surface water or ground water bodies.

salt-water barrier - a physical facility or method of operation designed to prevent the intrusion of salt water into a body of fresh water.

sediment - soil or mineral material transported by water and deposited in streams or other bodies of water.

seepage - the gradual movement of a fluid into, through, or from a porous medium.

service area - the geographical land area served by a distribution system of a water agency.

snow water content - a calculated or measured amount of water contained in packed snow based on its depth and density.

spawning - the depositing and fertilizing of eggs (roe) by fish and other aquatic life.

streamflow - the rate of water flow past a specified point in a channel.

surplus water - developed water supplies in excess of contract entitlement or apportioned water.

total dissolved solids (TDS) - a quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter. See **salinity**.

transpiration - an essential physiological process in which plant tissues give off water vapor to the atmosphere.

unimpaired runoff - represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.

waste water - the water, liquid waste, or drainage from a community, industry, or institution.

water conservation - reduction in applied water due to more efficient water use.

water quality - used to describe the chemical, physical, and biological characteristics of water, usually in regard to its suitability for a particular purpose or use.

water right - a legally protected right to take possession of water occurring in a natural waterway and to divert that water for beneficial use.

water table - see **ground water table**.

water year - a continuous 12-month period for which hydrologic records are compiled and summarized. In California, it begins on October 1 and ends September 30 of the following year.

watershed - see **drainage basin**.